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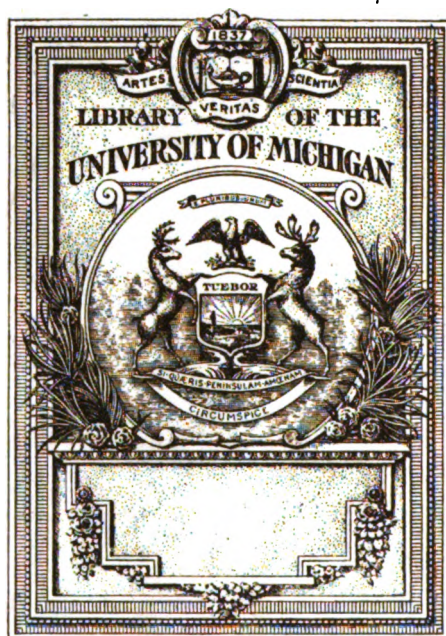
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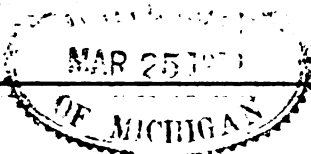
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THE GIFT OF
Rhode Island St. Board
of Health

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FIRST ANNUAL REPORT

OF THE

STATE BOARD OF HEALTH

OF THE

STATE OF RHODE ISLAND,

FOR THE

YEAR ENDING DEC. 31, 1878.



PROVIDENCE:

E. L. FREEMAN & CO., PRINTERS TO THE STATE.

1879.

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FIRST ANNUAL REPORT

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Printed by
the State Printer
C. 31, 1878.



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E. L. FREEMAN & CO., PRINTERS TO THE STATE.

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MEMBERS

OF THE

RHODE ISLAND STATE BOARD OF HEALTH,

WITH P. O. ADDRESS AND TERMS OF SERVICE.

	<i>P. O. Address.</i>	<i>Term Expires.</i>
DAVID KING, M. D.....	Newport.....	1884.
HON. ELISHA DYER, Jr.....	Wickford,.....	1883.
CHARLES H. FISHER, M. D.....	Scituate.....	1882.
GEORGE W. JENCKES, M. D.....	Woonsocket.....	1881.
WILLIAM T. C. WARDWELL, Esq....	Bristol.....	1880.
ALBERT G. SPRAGUE, M. D.....	Centreville.....	1879.

To the Members of the Rhode Island State Board of Health :

GENTLEMEN:—An account of the more important transactions of the Board, and the work of the Secretary, during the eight months ending December 31, 1878, is respectfully presented in the general report herewith submitted.

The organization of a new department of State administration in all cases, necessarily involves the employment of considerable time, in acquiring a full knowledge of the duties of that department, and in the devising of methods of systematic administration. Some part of the work assigned the Secretary of the Board had been previously performed in several diverse departments of the civil government, and, therefore, the labor required, to attain a familiar acquaintance with all the details of these different forms of service, and to discharge the duties appertaining thereto, together with the new duties imposed by the Act establishing the Board, has given quite full occupation to the time of your Secretary since his appointment to the office.

The work has been performed in three departments of labor, which, though having many points and objects in common, have still, in several respects, distinctly separate purposes and modes of procedure. And though there is a unity in the whole, in regard to the objects to be attained, there must continue to be the same general division. The three departments comprise the investigation of the causes of disease, the superintendence of the collection, classification and tabulation of vital statistics, and the work of the Cattle Commission.

In the report will be found suggestions and remarks in regard to the several departments of labor, and the plans with which the work is designed to be prosecuted, and which seem to promise the best results.

The several papers, which are added to the report, are all of a practical character, and the information they will furnish, on all the subjects treated, will be of substantial value to all who study them.

CHARLES H. FISHER, *Secretary.*

PROVIDENCE, January 19, 1879.

PROVIDENCE, R. I., January 22, 1879.

*To the Honorable, the General Assembly of the State of Rhode
Island:*

In compliance with the provisions of Chapter 680, of the Public Laws, the State Board of Health herewith respectfully presents the accompanying report of the Secretary, and appended papers, as the Annual Report of the Board, for the year ending Dec. 31, 1878.

DAVID KING, *Chairman.*

CHARLES H. FISHER, *Secretary.*

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REPORT OF THE SECRETARY.

I have the honor herewith to present my first Annual Report, as Secretary of the Rhode Island State Board of Health.

As an introductory to a clerical report of the doings of the Board, and the work of the Secretary, a brief history of the inception, and progress of the movement, which resulted in the Act of the General Assembly, establishing a State Board of Health, will be quite pertinent.

ORIGIN OF THE BOARD.

On the last day of the May session of the General Assembly for the year 1877, a bill to establish a State Board of Health, was introduced in the Senate, and was referred to the Committee on the Judiciary. The framing of the bill was the result of a sudden impulse to bring the question squarely before the public, during the recess previous to the January session of the year 1878. There was no expectation that the bill would go through the hands of the committees of both houses, and be put on its final passage in both on that day, but that it would go over to the next session as unfinished business.

The provisions of the bill, framed without access to any legislation of like character, were few, but the desired object was quite as well accomplished. At the January session of the General Assembly for the year 1878, the bill came up as unfinished business, and was transferred from the Committee on the Judiciary of the House, in whose docket it then was, to the House Committee on State Charities and Corrections. That committee, in conference with Dr. E. M. Snow, Superintendent of Health, of the City of Providence, a Committee of the Providence Medical Association, and the Senator who presented the original bill, framed a new bill, which was reported to the House by them, as a substitute for the bill referred to them.

Previous, however, to any active movement by the Committee on State Charities and Corrections, in the direction of framing a new bill, the Governor had received a communication from the Secretary of the International Medical Congress of 1876, enclosing a resolution of that body directed to the Governors of all the States, earnestly requesting them to recommend to their respective legislatures the enactment of laws establishing State boards of health, whenever such boards of health had not already been established. This communication was presented, and referred by the Governor to the Joint Committee on Executive Communications. That committee made the following Report.

REPORT OF THE JOINT COMMITTEE ON EXECUTIVE COMMUNICATIONS.

To the Honorable General Assembly :

The joint committee on executive communications, to whom was referred a "Circular and Resolutions of the International Medical Congress in relation to the establishment of State Boards of Health," respectfully report that they requested Dr. Charles H. Fisher, a member of said committee to prepare a paper on the general subject of State Boards of Health, which is herewith submitted and is as follows :

Mr. Chairman and Gentlemen of the Committee :

In compliance with your request, I herewith submit some suggestions, touching the questions involved in the communication of his excellency, the Governor, of a circular and resolution of the International Medical Congress, in relation to the establishment of State boards of health.

The first question which naturally presents itself, is the one of practical utility,

IS A STATE BOARD OF HEALTH NEEDED ?

If answered in the affirmative, then follows the question: what are the reasons for so believing! In order to intelligently consider the question, it is necessary, first to make a statement of facts, appertaining to the general public, in relation to health and life, and their influences, social, civil and political. The value of public health can scarcely be overestimated. It is the absolutely indispensable foundation, of a vigorous and prosperous state.

PUBLIC HEALTH IS PUBLIC WEALTH,

said the statesman and philosopher, Benjamin Franklin.

What is public wealth ?

By whatever name we may express the units and constituents of wealth, it is in the aggregate almost wholly the product of labor. Labor to be effective, must depend on good health, and so indirectly, *health is wealth*, or its chief factor.

INVALIDISM IS A PUBLIC AS WELL AS PRIVATE CALAMITY.

Every individual disabled wholly or in part, by sickness, is to that extent and degree of disablement, not only a burden and loss to self and family, but also a burden and loss in various ways to the community and the State.

Invalids not only lose their own time for productive labor, but compel to a greater or less extent, the loss of time of others in their care, and also sustain pecuniary losses, to recover which, entails still further personal loss of time, and therefore loss to public productiveness.

Setting aside for the present all moral and humanitarian aspects of the question, suppose it to be examined solely on the business and pecuniary side, in the light of dollars and cents.

Assuming there are only 250,000 persons residing in the State, would it be unreasonable to assert that on an average there are 12,500 persons of all ages sick, or one in every twenty of the whole, i. e. five per cent., and that the requisite attention to the sick would require the time of somewhat above half as many more, say 7,500, or three per cent., making 20,000 in all, or eight per cent. Now if the labor of the whole population will average seventy-five cents per day, the scale running from nought to \$20 or more, here is a clear loss of \$15,000 a day to private and public wealth, during the continuance of the sickness, to say nothing of the loss thereafter; \$15,000 a day for 300 days makes the large sum of \$4,500,000.

That this estimate is not too high, may be inferred from the report of the Superintendent of the Census of 1875. On page 151 it is stated that the average wages in the whole State, for the woolen manufacture, was for all ages \$1.17½. In this as well as in cotton and other employments, are children of ten years of age. On page 152 it is stated that in the cotton manufacture the average wages per diem are higher. These employments are referred to because they are supposed to afford the minimum wages of all occupations. In the professional, commercial and mechanical employments the average wages are considerably in excess of the manufactures alluded to.

It is believed that a very considerable part of the sickness that afflicts humanity is preventable. This belief is founded on what seems to be positive evidence, afforded by results of measures taken in some localities for the prevention and restriction of various diseases. Health boards have been in operation in many parts of England for more than thirty years, and the results of their labors have been so satisfactory as to lead the general government to establish them in almost every

borough of the kingdom. The reports *show conclusively that the sickness and mortality of those localities have been very materially reduced.* Suppose in Rhode Island by means of proper measures, the sickness could be diminished five per cent., which certainly is a low estimate, we should, on the calculation above, have a daily saving of \$750, or a yearly saving of \$236,000. This seems like a large saving for a small expenditure of money, but the conclusion is justified by facts!

We have another item of loss in the death of individuals. It may be assumed that the average individual at twenty years of age is worth in prospective availability, the average cost of support during the period of dependence, including food, clothing, education, care when young and in sickness, expenses of sickness, and every item, directly and indirectly. Suppose the average sum be estimated at \$100 per annum, then the average individual would have, at twenty years of age, a personal value of \$2,000 at least, (as no interest on cost is added,) as an investment of the public, and capable of adding to the public wealth a fair dividend, say five per cent., or \$100 per annum.

Now according to life and annuity tables, such person would have an expectation of fifty-two years of life, and an average of forty-five years of effective and productive value. It will be seen that the amount at the end of forty-five years, would be a very considerable sum. But if the individual should be stricken down by death, at that age, then the whole would be lost, and so would a proportionate loss be sustained by the death of an individual at any time, during the period of development or effectiveness.

In regard to this estimate, it may be stated that on page 158 of the Report of the Census of 1875, the total products of the State, for the year ending June 1st, 1875, were \$133,025,291; equal to \$515.12 for each person, of all ages in the State; or an average of about \$1.72 per day for every man, woman and child, allowing fifteen days each for lost time per annum. Now, with the previous estimate of the average of 75 cents per diem for individuals of all ages, sick or well, from infancy up, the amount of wages for labor for 300 days would be \$58,101,750, leaving about \$75,000,000 profit. This would leave, also, nearly \$300 per annum for every person of all ages and conditions in the State, as an addition to the public wealth, instead of \$100, the previous estimate.

The mortuary tables of the registration report for 1876, show the decease of 4,116 individuals during that year. Of these, at least 3,500 were in the effective, or expectantly effective period of life. Suppose the average public value of these persons be estimated—not at \$2,000,

the average value at twenty years of age, but at one quarter that sum—\$500, the loss to the public would then amount to the large sum of \$1,750,000. Now if by State action, five per cent. of these lives could have been saved, and that cannot be called a high estimate, we shall find the number of lives which might have been saved to be 175, and the amount of prospective public wealth preserved, the sum of \$87,500. If to this sum we add the \$236,000, the moderate estimate of the annual amount saved by the prevention of sickness, we have then the very large sum of \$323,800, which it is believed might be annually saved the State, by such measures as could be put in effective operation by a judicious board of health. Of course, there are many minor items of loss, public and private, which are the inseparable concomitants of sickness and death, not now to be taken into account, the purpose of this paper not contemplating the aggregation of minor details. The foregoing simply presents a summary exhibit of the coarser financial features of the question, on the dollar side.

If we now take into consideration the moral aspect of the question, we are met at the threshold with a multitude of facts, more abhorrent and appalling, than can be presented from any other view. It would be impossible, within the proper limits of this paper, to portray, except in the most cursory manner, the immense amount of degradation, vice and crime, that directly or indirectly have their origin in sickness of the body. They seem to be mutually causative the one of the other, and mutually convertible. Sickness in some, benumbs the moral nature, clouds the judgment, induces nervous irritability that intensifies the animal propensities, and these lasting longer than the return of bodily strength, through perversion of moral sense, plunge the unhappy victims into dissipation and degradation. But for sickness, many slums of vice would be depopulated.

How sickness of body taxes the resources of the State can be readily traced through various down hill grades, to the alms houses, jails, and penitentiaries. The civil and political aspects of the question, are so intimately involved in the brief considerations above, that they need no separate discussion.

By these statements we find the State a great loser by reason of sickness and death. Suffering financially, suffering socially and morally. The foundations of public and private virtue sapped, its future prosperity and existence endangered. What then? Can anything be done to stay the moral and physical death? The laws of nature are beneficent, rightly observed, but violated, are a two-edged sword. Though absolute, they are not tyrannical, they recognize the sacredness of

human life, and the blessedness of human health. The great fear of human mortals should be less the servile fear of human authority and human opinion, and more the fear of Divine authority, as declared and administered through the laws of nature. But when natural laws are recklessly or ignorantly violated by masses of citizens, it is the *duty* as well as the right of the State to interpose, and while seeking diligently to enlighten its people, should also affix a just penalty for violation of its own laws, enacted for the better observance of the laws of nature. It does seem as if the time has come when the State *cannot justifiably* withhold its authority in the devising and maintaining of proper measures for the protection of life and health, by instituting such inquiries in regard to the influence of locations, occupations, habits, customs and indulgences, as humanity requires, and by such interference in the removal of causes of sickness and death as common justice demands.

ECONOMY OF EARLY SANITARY ACTION.

The towns of Rhode Island are, with very few exceptions, in process of steady growth in population. Within some of them are conditions limited to small areas which, if allowed to remain, will, at no very distant day, become sources of disease, entailing great pecuniary loss, private and public. In most of them, these sources of future danger can be removed or remedied at very small cost, during these earlier periods of their growth, and thus stamped out, much suffering and expense prevented. But, by reason of delay, may be so hidden by the so-called march of improvement, that their existence is lost sight of and forgotten, until the outburst of some terrible epidemic reveals the perilous and portentous fact. And also, by reason of delay, some of these fountains of death may become so incorporated with large pecuniary investments, and thereby acquire the title of "vested rights" of individuals, that, though the right of eminent domain should be unlimited in the interests of public health, there would still remain the probability of costly litigation, and heavy damages. The attention of the general public, under direction of recognized authority, would readily detect many of these future sources of disease, and so be easily and cheaply preempted in the interests of humanity and public health.

For the purposes suggested above, of the prevention of disease and the protection of life, and thereby the enhancing of the interests of individuals and the State, it cannot be reasonably denied that

A STATE BOARD OF HEALTH IS NEEDED.

Because there is no other agency to effect the desired objects, or put in operation the desired measures. It is true that all intelligent and well educated physicians are regarded as the established conservators of the public health, and it is their duty to observe and study diseases in all their relations, to collect facts in regard to circumstances surrounding, as well as conditions personal to, and inhering in, the suffering individual, but they cannot, without going outside the daily routine of professional work, and at pecuniary loss, enter upon the wider labor of a comprehensive survey of the entire broad field of morbid phenomena, as affecting a large area of communities. This work, it is *the policy as well as the duty* of the State to put in operation. The question may be asked, how can a board of health accomplish the desired objects?

BY POPULARIZING A KNOWLEDGE OF THE MEANS OF AVOIDING DISEASES.

The dissemination among the masses of the people, of information in regard to the prevention of disease, emanating from acknowledged authority, would without question be respected, and its suggestions be largely observed. Such information, widely diffused, need not necessarily be attended with much expense. Tracts of one, two, or more pages of printed matter, at insignificant cost, can be scattered among the families of the State where they would be of value. Such distribution might be easily accomplished through town superintendents of public schools, and many other agencies. Then again, doubtless, the public press, at intervals, would admit short articles of a half column or so, without any expense to the State, on the policy of furnishing to its readers matter of public interest and value. In this way great numbers of the people, otherwise ignorant, thoughtless or indifferent, would have their attention effectively called to sources of danger and the means of defence. Notwithstanding the fact, that so many

" Know the right and approve it too,
But know the wrong, and yet the wrong pursue,"

and the known perversity and carelessness, characteristic of human kind, it must be admitted that popular hygienic information and instruction, so diffused, must inevitably largely influence the public mind and perceptibly decrease the percentage of sickness and the death rate. Among the common causes of preventable disease, about which the masses of the people need more positive knowledge, may

be mentioned vitiated air, absence of light, morbid emanations from cess-pools, sink drains, decomposing garbage; haze and dusts holding animal, vegetable or inorganic irritants and poisons, special morbid products derived from diseased bodies of men or animals, exhaustion of physical and mental vitality, by too prolonged or excessive labor of body or mind, loss of sleep; violent anger, grief or joy, and long immersion in cold and humid atmospheres. It will be seen that a State board is needed

TO GIVE UNITY OF PURPOSE AND EFFECTIVENESS

to diffusion of sanitary knowledge, and to direct investigation in a systematic manner:

1. The first, and the continued leading object of a State board of health should be (*a*) the general enlightenment of the people in sanitary knowledge, (*b*) so that they may have a clear understanding of the rights, duties and responsibilities of all persons in relation to public as well as to personal health; and (*c*) to perceive the necessity of the earnest observance and enforcement of good sanitary laws and regulations, as the foundation of success, in the promotion of health and longevity.

2. To act as a central board in giving enlightened direction to all labors of a sanitary character, that may be instituted in different sections of the State; first, by suggesting systematic and uniform methods of inquiry and investigation; second, by suggesting the best modes of applying general sanitary laws to special or local circumstances; and third, by suggesting to local authorities the presumably best means of securing popular support to local sanitary administration; and fourth, by encouragement and promotion of formation of village health clubs, who will look after the performance of the sanitary duties of their respective localities, under the superintendence of the central board.

3. In reference to the above remarks, it need hardly be observed that the inference is clear that every person, family, community, town and city, have each certain individual and local, as well as general, duties and responsibilities in regard to the prevention of disease and loss of life, and while more widely spread and general causes of peril to life and health exist, requiring a central sanitary organization, such central organization can most fully accomplish its purpose by giving unity of purpose, counsel and aid to local organizations.

4. Such local organizations, by observation and inquiry, can collect a mass of facts, not otherwise so well attainable. These facts singly, may seem and be of little value; but, reported from many points, over a considerable extent of territory, and under a great variety of circumstances, will, when properly arranged and classified, and subjected to a reasonably inductive method of study, become a valuable basis for generalizations and logical conclusions, and also valuable as affording great aid in the observation and detection of new facts. Sanitary observations must necessarily extend over a considerable territorial area, comprising cities, towns and villages, neither of which alone can furnish all the facts absolutely needed for full generalization. What is true of a city, may not be true of a country town or village, any more in sanitary matters than in morals, habits or customs. Consequently, the jurisdiction of the central board, should comprise supervision, not only of important, but also such as at first thought, might be regarded as unimportant localities.

There has been in contemplation, for a number of years, the establishment at the national capital of a national health bureau, or a public health commission for the United States. Such a bureau like the signal service office, must be in regular correspondence with responsible bodies in all the several States; bodies having defined duties and authorities, such as are conferred on State boards of health. At this time there are three departments of the national government doing all their limited authority will allow, in the way of collecting an accurate knowledge of, and in the restriction and prevention of diseases, mostly of an epidemic character. They are the surgeon general's bureau of the army, the medical department of the navy, and the marine hospital service. Compared with what might be accomplished by a bureau established for the specific purpose of promoting the national health, their work is very limited. When all the States, or nearly all, (and the time is near at hand, nearly one-half already) have established boards of health, then the knowledge acquired in the several States can be utilized by a national board, to the great advantage of the nation. Without question, in a majority of cases, the inception and development of pestilences can be detected at the outset, the course of the epidemics, and the spread of the contagion arrested, and their existence stamped out.

A bill is now pending in the Senate of the United States, having passed the House of Representatives with such unanimity as to give good assurance of its becoming a national statute, to aid State and municipal authorities in excluding from the country contagious and

infectious diseases. It requires weekly reports from Consuls of the sanitary condition of foreign ports, and oftener by telegraph if at hand, if needful to announce the departure of suspected vessels or persons, and requires all needful information to be distributed to the local State and municipal authorities, by the Surgeon-General of the Marine Hospital Service. It alludes to State organization of boards of health in such a way as to lead to the inevitable inference that the general government expects that state boards of health will be soon universally established throughout the country.

The limited time allotted me forbids a more extended consideration of the subject at the present time; but such suggestions as have been made are simply skirmishing on legitimate ground, for the more the field of sanitary observation, presenting prospective benefits from systematic legal supervision, is surveyed, the wider its borders extend. There is to-day in all the broad world no material agency of any kind whatsoever, that is working out so many, promisingly beneficent results to mankind, as that which is involved in the universal application of the laws of sanitary science. They are demonstrating that health and longevity are the natural inheritance of mankind; that disease is abnormal, and death accidental, except from natural decline of age; and that both are largely preventable by human agencies.

CHARLES H. FISHER,

For the Committee on Executive Communications.

The above report of the Joint Committee on Executive Communications, was presented in the Senate simultaneously with the introduction in the House, by the Committee on State Charities and Corrections of the new bill for the establishment of a State Board of Health. This bill after reference to another committee of the House, and after various delays, verbal alterations and amendments in both houses, was finally passed and became a law as follows :

AN ACT TO ESTABLISH A STATE BOARD OF HEALTH.

It is enacted by the General Assembly as follows:

SECTION 1. The Governor, with the advice and consent of the Senate, shall appoint six persons, two from the county of Providence, and one from each of the other counties, who shall constitute the State Board of Health. Of the persons so appointed, at least three shall be well educated physicians and members

of some medical society incorporated by this State. The Governor may remove any member for cause, at any time, upon the written request of two-thirds of the Board.

SEC. 2. The six persons first appointed, shall be appointed for one, two, three, four, five and six years respectively, and hereafter, the Governor, with the advice and consent of the Senate, shall appoint one member of the Board annually, for the term of six years from the first day of July. Any appointment to fill a vacancy, shall be for the remainder of the term.

SEC. 3. The Board shall take cognizance of the interests of life and health among the citizens of the State; they shall make investigations into the causes of disease, and especially of epidemics and endemics among the people, the sources of mortality, and the effects of localities, employments, conditions and circumstances on the public health, and shall faithfully do all in their power to ascertain the causes and the best means for the prevention of diseases of every kind in the State. They shall publish and circulate, from time to time, such information as they may deem to be important and useful for diffusion among the people of the State, and shall investigate and give advice in relation to such subjects relating to the public health, as may be referred to them by the General Assembly, or by the Governor when the General Assembly is not in session.

SEC. 4. The State Board of Health shall also investigate the subject of diseases among cattle or other animals, and perform all the duties which have been delegated to the Board of Cattle Commissioners in Chapter 76, of the General Statutes of the State.

SEC. 5. Section 3, of Chapter 76, of the General Statutes, is hereby repealed, and the Board of Cattle Commissioners heretofore constituted under authority of said section, is hereby abolished.

SEC. 6. In every section of Chapter 76, of the General Statutes, where the word "commissioners" occurs, it shall be construed to mean State Board of Health.

SEC. 7. The State Board of Health shall receive the returns of births, marriages, deaths and divorces, and shall prepare the annual report upon the registration of the same as now required by law, but after the report is prepared, the returns shall be deposited in the office of the Secretary of State, to be bound and indexed by him as heretofore.

SEC. 8. Wherever the words "Secretary of State" occur in sections 1, 2, 3, 16 and 19, of Chapter 77, of the General Statutes, they shall be construed to mean Secretary of the State Board of Health, and in the sixth line of section 2, of said chapter, the word "he" shall be construed to mean Secretary of State. Section 17, of Chapter 77, of the General Statutes, is hereby repealed.

SEC. 9. The Board shall meet in the city of Providence once in three months, and as much oftener as they may deem necessary. No member of the Board, except the Secretary, shall receive any compensation for his services; but the actual personal expenses of any member, while engaged in the duties of the Board, shall be paid by the State.

SEC. 10. The Board shall elect a well qualified physician as their Secretary.

SEC. 11. The Secretary shall perform and superintend the work prescribed in this law and such other duties as the Board may require, and he shall receive such salary, not in excess of twelve hundred dollars per annum, as the Board may determine. He shall hold his office at the pleasure of the Board, but may be removed at any regular meeting by a majority vote of the members thereof.

SEC. 12. The Governor shall provide a suitable office for the Board, in the city of Providence, and the actual expenses of the Board and of the members thereof, when certified by the Chairman and approved by the Governor, shall be paid from the treasury of the State.

SEC. 13. The Board shall make a report in print, to the General Assembly, annually in the month of January, of its proceedings during the year ending on the thirty-first day of December next preceding, with such suggestions in relation to the sanitary laws and interests of the State as they shall deem important.

SEC. 14. All acts and parts of acts inconsistent herewith are hereby repealed.

SEC. 15. The several town councils and boards of aldermen shall still be *ex-officio* boards of health in their respective towns, as is now by law provided; *provided, however*, that the city council of any city may appoint a board of health for such city, which shall have all the powers and duties now conferred by law upon the board of aldermen as a board of health.

In accordance with the provision of the law, requiring the "Governor with the advice and consent of the Senate," to appoint the six persons who together should constitute the Board, His Excellency at a proper time presented to the Senate, the following persons in the order named, with the county represented, and the terms of service respectively, viz :

DAVID KING, M. D., Newport County.....	six years.
ELISHA DYER, Jr., Washington County.....	five "
CHAS. H. FISHER, M. D., Providence County.....	four "
GEORGE W. JENCKES, M. D., " " " " " " " " " " " "	three "
WM. T. C. WARDWELL, Bristol " " " " " " " " " " " "	two "
ALBERT G. SPRAGUE, M. D., Kent " " " " " " " " " " " "	one "

The appointees were unanimously confirmed by the Senate:

ORGANIZATION OF THE BOARD.

Ten days after the rising of the General Assembly, to wit: the 22d day of April, the members elect were called together at the State House in the city of Providence, by David King, M. D., of Newport, in obedience to the order of the Governor. Upon the assembling of the members, the oath of office was administered by the Secretary of State, and after calling the meeting to order, Dr. King made the following remarks :

Gentlemen of the State Board of Health :

By order of the Governor of the State, it has become my duty as your senior member, to call together the members of the Board. The objects of our investigation are of the highest importance to the welfare of the State. Within the department of public health, improvements and reforms, inaugurated by us, will be beneficial in their tendency, and permanent in their influence. We cannot but engage in the respectable, I may say, high duties, assigned us by the government of the State, with the pleasing and assured prospect of accomplishing much good in our midst.

It will be our duty to take cognizance of the interests of life and health among the citizens of the State, to make investigations into the causes of disease, the sources of mortality, and the effects of localities, employments, conditions and circumstances on the public health, and to faithfully do all in our power to ascertain the causes, and the best means for the prevention of diseases of all kinds in the State. And not of men alone, but to investigate also, the subject of diseases among cattle and other animals.

The field of our duties and labors is therefore wide, embracing every circumstance and agency that can affect animal life, or man, regarded as a physical being, or as a physical being endowed with an intellectual and moral nature.

A distinguished writer of acknowledged authority has declared, "that public or State medicine has for its primary object the prevention of disease; the surrounding the sick with conditions most favorable to recovery; and the diminution in a marked manner of the death roll of the people; that the ultimate object of State medicine is the improvement of the races of men to their highest possible degree of perfection." This may be regarded as a fair and comprehensive statement of the aims and purposes of the State Board of Health.

In the consideration and investigation of subjects having a practical bearing on public health, I trust that we shall deliberate and act with a due sense of the responsibility placed upon us by the Governor and General Assembly, and with the spirit and energy of men entrusted with these most important interests of the State.

Among the subjects especially demanding our attention, may be mentioned:

1. Epidemic, Endemic, and Contagious Diseases.
2. Sewerage and Drainage.
3. Food, Drinks, and Water-Supply.
4. Buildings—Public and Private; including Ventilation, Heating, etc.
5. Climate—General and by Season of Year; and as related to Age of Inhabitants.
6. Disposal of Excreta and Decomposing Organic Matter.
7. Poisons, Explosives, Chemicals, Accidents, and Special Sources of Danger to Life and Health.
8. Occupations and Recreations.
9. Education: the Relation of Schools to Health, the kind and methods of instruction in use, and methods to be proposed.
10. Geology and Topography: Influence on health, of Forests and their removal, Shade Trees near Dwellings, etc.
11. The Death-Rate as influenced by Age, Climate, and Social Condition.
12. Legislation in the Interests of Public Health.
13. Finance.
14. Mental Hygiene.

A temporary organization was then formed, and upon the calling of the roll, the following members were found present, viz:

DAVID KING, M. D.....	Newport.
Hon. ELISHA DYER, Jr.....	Wickford.
GEORGE W. JENCKES, M. D.....	Woonsocket.
CHARLES H. FISHER, M. D.	Scituate,
ALBERT G. SPRAGUE, M. D.....	Warwick.

Upon motion, Dr. David King was unanimously elected permanent Chairman, and Charles H. Fisher, permanent Secretary.

WORK OF THE BOARD.

Under this head, it is not designed to report all the transactions, that are put on the record of the various meetings of the Board, but such only as will give a general outline of the plans and purposes governing its action, in laying out work for itself and the Secretary.

At the meeting for organization, and following the election of officers, considerable informal discussion of various topics relating to the public health ensued. The subject of the prevalence of glanders and farcy among horses, was considered at greater length than any other, and the necessity of immediate action for its restriction was apparent. A set of regulations having particular reference to glanders and farcy in horses was adopted, and the Secretary was authorized to publish the same in the newspapers of such counties or districts, as were found by inquiry to have horses affected with the said disease. The advertisement was as follows:

RHODE ISLAND STATE BOARD OF HEALTH.

GLANDERS IN HORSES.

At a meeting of the State Board of Health held Monday, April 22, 1878, the following regulations were adopted and ordered to be published:

1. The owners of, or any person having the care of any horse or other animal, knowing the same to have the disease called glanders or farcy, shall keep such horse or other animal apart and separate from all other horses or animals.
2. The owner, or any person having the care of any horse or other animal, knowing the same to have the disease called glanders or farcy, shall not lead, nor drive, nor permit such horse or other animal to go in or over any public street, road, lane or highway in this State.
3. Any veterinary surgeon or other person who shall have knowledge of any horse or other animal that has the disease called glanders or farcy, shall report

the existence and location of such case of disease to some member of the State Board of Health within twenty-four hours after receiving knowledge of the same.

The penalty for failure to comply with the above regulations, as fixed by Section 8, Chapter 76, of the General Statutes, is a fine not exceeding three hundred dollars, or imprisonment not exceeding one year.

The first section of the same chapter provides that any person who shall knowingly expose a horse or other animal having any infectious or contagious disease to other horses or animals not infected with such disease, shall be fined not less than one hundred dollars, nor more than five hundred dollars.

Section 7 provides that any person who shall sell or offer to sell any horse or other domestic animal known to him to be infected with any contagious disease, shall be fined not more than one thousand dollars, or be imprisoned not exceeding two years, or both, at the discretion of the court.

All persons are urgently requested to give immediate information to some members of the State Board of Health of any known or suspected case of glanders or farcy that may come to their knowledge, and such cases will be immediately investigated and measures taken to prevent the spread of the disease.

The names and post office address of the members of the State Board of Health are as follows: David King, Newport; Elisha Dyer, Jr., Wickford or Providence; Charles H. Fisher, North Scituate; George W. Jenckes, Woonsocket; William T. C. Wardwell, Bristol; Albert G. Sprague, Centreville.

By order of the State Board of Health.

DAVID KING, Chairman.

CHARLES H. FISHER, Secretary.

PROVIDENCE, April 24, 1878.

These regulations had been previously adopted and published by the preceding Cattle Commission. The Secretary was also authorized to employ, the same means and agencies heretofore employed by the Board of Cattle Commissioners, for the purpose of ascertaining the existence, and for the restriction and suppression of glanders and farcy, or any other highly contagious and dangerous diseases, among horses or other domestic animals. (*See Cattle Commission page 11.*)

At the same meeting a committee was appointed to draft a code of By-Laws for the government of the Board. Dr. George W. Jenckes, chairman of that committee, reported at the next subsequent meeting, a code recommended by the committee. The several sections of the reported code were taken up in order, considered, and severally adopted. They are as follows:

BY-LAWS.

SECTION 1. This body shall be known as the Rhode Island State Board of Health.

SEC. 2. The officers of the Board shall consist of a Chairman, Secretary and Auditor, to be chosen annually at the meeting in July.

SEC. 3. The duties of the chairman shall be to preside at the meetings of the Board, to put all votes, to decide questions of order, and to appoint all committees when not otherwise voted by the Board. He shall certify all audited bills to the Governor for payment.

SEC. 4. The Secretary shall perform all duties prescribed in the act establishing this Board, shall keep a record of the proceedings, shall do all acts usually incident to the office, and shall notify the members of all regular meetings, and by the advice of the Chairman, shall call all special meetings.

The Secretary shall have an office in the city of Providence, which he shall keep open between the hours of one and three o'clock P. M., upon all business days.

SEC. 5. The auditor shall examine all bills and vouchers, and if correct shall certify the same to the Chairman of the Board.

SEC. 6. A majority of members shall constitute a quorum to transact business but any member may adjourn.

SEC. 7. The regular meetings of this Board shall be holden at its office in the city of Providence, on the first Wednesday of July, October, January and April, respectively, at such hour as the Board may by vote determine from time to time.

VITAL STATISTICS.

No department of the work of the State Board of Health is of more importance than that which relates to the collection and registration of births, marriages and deaths. Twenty-five years ago, many collectors of returns of births and deaths, were met with censure, and even with resistance, from some persons who occupied respectable positions in society. The law, and the work of carrying out its provisions, were denounced as a scheme concocted mainly for partisan and political purposes. All feeling of that kind has now no existence except among the lowest and most ignorant class of our population. The value of such registration in relation to the legal rights of individuals, is now too clear to be disputed, but there are many minds still clouded, in regard to the value of the registration of births, and of full returns of the attendant conditions and circumstances of

death, as a basis of sanitary and social and political economy. These clouds, however, must at no distant day disappear, when their importance, properly classified, arranged and compared, for sanitary study is better known, as have those which a few years since obscured some ordinary minds in regard to the value of registration, in relation to descent and inheritance.

• The opposition to the collection of statistics alluded to above, does not apply solely to this State. The measures taken to obtain such facts as were called for in the United States Census of 1790 were violently opposed by the people in some of the States as an invasion of private rights.

It required several years to satisfy large masses of citizens, that the movement would promote a large public interest, that the country would not know itself, but for the facts elicited and spread before the people by each decennial Census.

The enumeration of the peoples, of the products, and of the properties of all kinds, shows us what we are, what we have in possession, how we progress. By this enumeration the government learns its military and financial strength. By it is ascertained what will best promote the prosperity of sections, and what, that of the country at large.

The enumeration of births, marriages and deaths in the United States Census, has been found quite as important as that of any other class of statistics. It indicates the bodily vigor, the moral tone, the relative longevity, and consequently the status of the public health, in the various divisions of the country, its augmentation or its decline. Upon public health depends the strength and stability of the government, and therefore by these statistics it may learn its probable prosperity or adversity.

RETURNS OF BIRTHS.

The Statutes provide that the town clerk of any town, or some person appointed by the town council, or board of aldermen of a city, shall obtain all information concerning births, occurring during the previous year among the inhabitants of their respective towns, and on or before the first Monday in March annually, to make certified returns thereof to the State Board of Health. This mode is doubtless as effectual for accurate returns, as any that can at present be devised. It is especially useful in obtaining the full names of children born, early in the preceding year, which could not be done soon after birth. It is, however, defective in that it fails to enumerate

in many towns, all the births that have occurred in those towns. The frequent removals of families from one town to another; the occupation of the same tenement by several families during the year; therefore, births occurring in these migratory families are not returned, because few or no facts can be ascertained in regard to them in the towns where they occurred, and they cannot be registered in the towns where they are found, during the months of January and February of the ensuing year. Some births also fail to be returned because of the death of the child in early infancy, and forgetfulness or indifference on the part of parents and neighbors.

Different methods of collecting birth statistics have been adopted, since the first registration law was enacted. It was at one time obligatory on the part of the parents to make return to the town clerk within ten days after the occurrence of the birth of any child.

Physicians were also required by law to make returns of births occurring in their practice, and a small fee to be paid out of the town treasury was allowed therefor. But the present mode has been far more efficient than any other heretofore tried. It might be suggested that amendments to the present law be made, requiring the collector of birth returns, when he ascertains that a birth had occurred in another town, in any family living in the town which he is canvassing, he shall make a separate return of such birth, which he shall transmit to the town clerk of the town in which such birth occurred, and receive therefor, from the town to which such return was made, a fee double the usual amount.

The form of Returns of Births have varied somewhat since the passage of the Registration Act of 1854. The form now in use is as follows :

RETURN OF A BIRTH.

STATE OF RHODE ISLAND.

1. Date of Birth ?.....	.....
2. Full name of the Child?.....	.....
3. Sex?.....	.....
4. Color?.....	.....
5. No. of Child of Mother?.....	.....
6. Place of Birth?.....	.....
7. Father's Name?.....	.....
8. Father's Age?.....	.....
9. Father's Occupation?...	.....
10. Father's Birthplace?....	.....
11. Mother's Name?.....	.....
12. Mother's Maiden Name?..	.....
13. Mother's Age?.....	.....
14. Mother's Birthplace?..	.....
15. Color of Parents?.....	Fa..... Mo.....
16. Remarks.....	.....

INFORMANT.

N. B.—At No. 2, give the full name of the child, and be particular to get middle name in full. At No. 4, state whether the child is white, black, or mulatto. At No. 5, state whether it is the 1st, 2d, 3d, etc. child of the mother. At No. 6, give the street and number, if in the city, the town and State, if elsewhere. At Nos. 8 and 13, give the age at last birthday. At Nos. 10 and 14 give the town and State, if in this country.

If the child was still-born, or has died since its birth, state the facts at No. 16, with any other facts of interest.

In case of twins or triplets, a separate blank is to be filled for each child.

RETURNS OF MARRIAGES.

The returns of marriages in the State of Rhode Island, are without question more full and accurate than those of births and deaths. The popular impression of their importance to the public at large, as well as to the individuals immediately interested, is much stronger, and the feeling of responsibility on the part of those who perform the ceremony, is clearer and more imperative. The returns of marriages for the whole State, for the year 1877, were 2,282, as against 2,253 for the year 1876, showing that the prevailing hard times, have not prevented a partial return toward the number registered in previous years. For the year 1873 there were returned for the whole State 2,630. The form of return now in use is as follows:

[FACE.]

RETURN OF A MARRIAGE.

STATE OF RHODE ISLAND.

1. Full name of GROOM?.....	.....
2. Place of Residence? .....	.....
3. Age in years?.....	.....
4. Occupation?.....	.....
5. Place of Birth?.....	.....
6. Father's Name?.....	.....
7. Mother's Maiden Name? .....	.....
Parents' Birthplace?..	Fa..... Mo.....
Parents' Occupation?..	Fa..... Mo.....
8. Full name of BRIDE?.....	.....
(Maiden name if a widow?) .....	.....
9. Place of Residence?.....	.....
10. Age in years?.....	.....
11. Place of Birth?.....	.....
12. Father's Name?.....	.....
13. Mother's Maiden Name? .....	.....
Parents' Birthplace?..	Fa..... Mo.....
Parents' Occupation?..	Fa..... Mo.....
14. No. of Marriage?....	Of Groom?.....Of Bride?....
15. Color of the Parties?.....	.....

N. B.—At No. 15, state whether white, black or mulatto. At No. 14, state whether this marriage is the 1st, 2d, 3d, &c., marriage of each. Give middle names in full.

.....18

We, the Groom and Bride named in the above certificate, hereby certify that the information given is correct to the best of our knowledge and belief.

.....GROOM.

.....BRIDE.

Signed in presence of

and.....

N. B.—The above blanks must be filled, and the certificate must be signed by both Groom and Bride, and must be given to the person about to solemnize the marriage, *before* the marriage can be legally solemnized in the State of Rhode Island.

[REVERSE.]

CERTIFICATE OF MARRIAGE.

STATE OF RHODE ISLAND.

I HEREBY CERTIFY, That.....and
were joined in Marriage by me, in accordance
 with the laws of the State of Rhode Island, in the town of.....
 this.....day of.....A. D. 18

ATTEST.....

Witnesses to the Marriage.....

N. B.—The Clergyman or other person solemnizing the marriage is required to sign this certificate, and return it to the Clerk or Registrar of the town or city in which the marriage takes place, *on or before the second Monday of the month succeeding the date of the marriage.*

The laws of Rhode Island require at least two witnesses to be present at a marriage, in addition to the parties and the Clergyman officiating. Give the names of two who were present.

RETURNS OF DEATHS.

The mortuary records of the State, can be made to furnish a vast amount of valuable information, when the physicians' certificates, make definite replies to specific questions, touching the phases and characteristics of fatal diseases, and the conditions and circumstances under which the deaths occur. It is, however, too much to expect, that returns bordering on completeness in that respect can at any early day be available.

The general professional mind must first be imbued with a deeper feeling of regard for the best welfare of its patrons beyond the period of immediate sickness, and also of responsibility to the great public and the State. "To make investigations into the causes of disease, the sources of mortality, and the effects of localities, employments, conditions and circumstances on the public health," as the law directs, must of necessity demand more extended interrogatories in the physicians' certificate, than have heretofore, or are now made in the returns of death. The town Registration Record of deaths, need not be changed for such additional questions, but the summarized Reports to be transmitted to the State Board of Health, must have spaces and columns to correspond with all the questions on the returns. Such blank Reports will be forwarded to all the town clerks in time for tabulation of the returns for the year 1879. Recognizing the great importance of *accurate* and *complete* returns of deaths for purposes of sanitary study, and desiring to ascertain how fully the provisions of the law were complied with, in regard to death returns, I sent the following circular (letter B) to the town clerks of all the towns in the State:

(CIRCULAR B.)

FROM THE OFFICE OF THE R. I. STATE BOARD OF HEALTH.

To the Town Clerk of

1. How many undertakers in your city, or town?
2. How many make returns as provided in Sec. 8, Chap. 77, of the General Statutes, and as amended by Sec. 3, Chap. 488, of the Public Laws?
3. What proportion have physicians' certificates appended?
4. Have delinquents ever been notified, that complaint would be made for neglect of duty, as provided in Sec. 11, Chap. 77, of the General Statutes?
5. If deaths are not reported by undertakers, how are they ascertained for the Annual Returns?

6. Has your town a Board of Health acting separately from the Town Council?
7. How many Health Officers are appointed by the Town Council or otherwise?

N. B.—Please reply by the numbers on the Postal Card, corresponding to the number of the questions.

C. H. FISHER, Secretary.

STATEMENTS OF TOWN CLERKS IN REPLY TO CIRCULAR B.

In answer to question Number 2, the clerks of thirty towns in the State, replied that few or no returns were made by undertakers, as provided by law, but in reply to question Number 5, that the returns of deaths were collected by the town clerk or some other authorized person during the months of January and February, in the year succeeding that in which the deaths occurred. It is easy to see how imperfect the collection of returns of the deaths in those towns for the whole preceding year must be.

In some cases the decedents are merely visitors or sojourners in the town, and if the facts of the case are not ascertained at the time of death, they can never be afterward. Again, many families in which deaths have occurred, have removed before the end of the year into another town, or out of the State, and therefore no account, or no correct account of such decedents can be obtained. In all of these cases the record of death is lost, for if the family in which a death has occurred in one town, is called upon by the collector of death returns in another town where they then reside, and statement is made to him of such death, it is of no account to him, as he is not required or expected to obtain returns of deaths that have occurred in another town.

In reply to question Number 3, twelve towns were reported, where no physicians' certificates whatever were appended to returns of deaths. In other towns the proportion having physicians' certificates attached, were given as one-eighth, one-quarter, &c., up to all where a physician was in attendance.

In relation to notifying delinquents, thirty-one towns answered in the negative to question Number 4, and twenty-eight towns replied no and none to questions 6 and 7.

It is needless to comment on the unreliable character of death returns for sanitary study, in which the causes of death are given by persons having very little knowledge of disease, and many times, a year after the occurrence of death.

By statute law, it is made the duty of the physician in attendance, to report every case of death at the time of its occurrence.

This is the only right time, because then, the character of the disease and all the attendant circumstances are fresh in his mind. Efforts will be made during the ensuing year to bring about a more prompt compliance with the Statutes, in relation to physicians' certificates of deaths, as well as to undertakers' returns. In furtherance of that object, the following circular (letter C,) was sent to all the town councils and town clerks in the State:

(CIRCULAR C.)

FROM THE OFFICE OF THE STATE BOARD OF HEALTH.

PROVIDENCE, December 2, 1878.

*To the Honorable the Town Council and the Town Clerk of the
Town of*

GENTLEMEN:—You are already aware that by the Act of the General Assembly establishing a State Board of Health, the manner of making the Annual Returns of Births, Marriages and Deaths, has been changed. The returns will now be made to the Secretary of the State Board of Health, and all blanks for that purpose can be obtained from him. It is expected every town clerk will comply with the law, as provided in Section 1, Chap. 77 of the Revised Statutes, especially when duly certified returns are made "*accompanying the same, with a list of those individuals, required by law to make returns to him, who have neglected the same.*"

It is hardly necessary in this connection, to call your attention to the great value of correct registration, of the births, marriages and deaths in your town. In their civil relations, affording definite evidence as to legal consanguinity, and rights of inheritance or entailments, rights and claims for pensions, insurance, or hereditary annuities. In their social relations, as a record and evidence of the public spirit, the moral tone and the disposition for associated interest, manifested at different periods of time. In their sanitary relations, though usually less apprehended they are no less important. Indeed, without them sanitary improvement would be greatly impeded. Without a record of births and deaths, the bodily vigor, the relative longevity, the average healthfulness, the tendency to particular diseases in any community, could scarcely be determined.

By such record, a clue to the laws of life and health is furnished. Such statistics afford the sanitarian, standing ground for observing the effects of localities, conditions, employments and circumstances of life, as causations of disease and sources of mortality. But, for *exact conclusions* there *must be correct returns*. False premises lead to defective and deceptive deductions. Incorrect returns lead astray. An investigation of the methods by which the registration returns

of this State have been obtained, and an examination and comparison of the returns so obtained, show that in some towns they are very inaccurate. The number of births returned from a town, have been less than the number attended by one practitioner of medicine in the town. Great negligence has also been practiced by undertakers and physicians, in regard to the returns of deaths. Attention is called to Sec. 12 of Chap. 77 of the Statutes, with the hope that every town council will require a record of the names of all the classes therein named, and give due notice to the same, that their duties as set forth in Sec. 4, Sec. 6 and Sec. 8 of Chap. 77, must be promptly performed.

The supply of blank returns of deaths, in the office of the Secretary of State have been exhausted. I have therefore ordered a sufficient number printed for present use, which will soon be ready at this office, for meeting the orders of Town Clerks and others therefor. In ordering the new blank death returns I have taken occasion to add, on the back of the same, additional sections of the law, in relation to making returns, and also a notice, that the Secretary of the State Board of Health, had been instructed to make complaint of violations of the law. I have also for greater accuracy and definiteness, particularly in the physicians' certificate, added more interrogatories. There is an important end to be gained by full replies to the questions, and it is very desirable that all engaged in filling out the returns, should feel a deep interest in making them as valuable as possible.

The necessity of vaccination, should also receive the attention of the Town Councils, as a means of stamping out one of the greatest scourges of the human race. The way of performing the operation in the school houses of the country towns, as it is usually practiced, hardly meets all the requirements of the case. In some instances not more than two or three are ready for the operation, while there may be five times that number in the district wholly unprotected by adequate vaccination, and the same proportion holding for larger numbers. It is important that some more effectual way should be devised. Town ordinances could be enacted to meet the difficulty.

Let no child go into the public schools, who cannot show proof of thorough vaccination, by physician's certificate, or otherwise. When the agent of the town canvasses for the School Census, as provided in Chap. 693 of Public Laws, or for returns of births, a very slight additional labor, would determine how many persons in the town were unvaccinated, and such knowledge would aid in devising means for the more effectual performance of the work. The *spirit* as well as the *letter* of the last four sections of Chap. 74 of the Statutes, should be thoroughly carried out. The present facilities for obtaining bovine virus fresh from the udders of the cow, obviates all objection heretofore urged against vaccination, as a possible means of the transmission of morbid humors, from one person to another.

It is suggested as a matter of importance, that in those towns where it is not already accomplished, one or more competent physicians should be appointed to act as the local or town board of health, subject to the authority, and in place of the town council.

Professional men whose training, and whose experience, have especially fitted them to be competent judges of what is prejudicial to the public health, can surely be more safely relied on for judicious application of the sanitary laws of the State, than those having no such knowledge.

All matters coming within the jurisdiction of the first six chapters of Title XIV, of the Revised Statutes, and all additions and amendments thereto, should therefore have professional administration.

It is hoped, and believed, as well as earnestly desired, that the local boards of health of the several towns, however constituted, will cordially cooperate with the State Board of Health, in the work of investigating the causes of disease, whether general or local, and thus secure within a reasonable period of time the prevention of a considerable amount of dangerous sickness, in the various communities, and a perceptible decrease, in the tables of mortality.

Very respectfully,

CHAS. H. FISHER, Secretary.

Since the above circular was sent to the town councils of the different towns, it has been noticed in the reports of the proceedings of several of those bodies, that they have ordered notice to be given to all parties concerned, that they must comply with the statutes, in relation to the returns of marriages and deaths.

Such measures should be taken by every town council in the State, for it is incumbent upon them to make the duties set forth in the laws of vital registration, obligatory on the part of those of its citizens who assume positions described therein.

The interrogatories added to the last issue of blank returns of deaths will find no column for them in the record of death returns, which is retained by the town for its own use, nor would the record of those sanitary questions be of value to the town were these blank records furnished for the purpose. They are of great interest and value, however, to investigators of the causes of disease, and the State Board of Health hope to have the returns properly filled, and as neither the town record, nor the record heretofore transmitted to the Secretary of State, have blank columns corresponding to all the questions, the Secretary of the Board, as heretofore suggested, will furnish blank records of smaller size for those additional questions, to the town clerks of all the towns, previous to the time when they will be needed.

It may be observed that the questions in the blank returns of deaths used for two or three years past, have not all had blank spaces for their separate entry on the town and State general records, and have therefore been of no increased value for sanitary study.

The form of returns of deaths just issued, will be found on the following pages:

[FACE.]

RETURN OF A DEATH.

STATE OF RHODE ISLAND.

1.	Date of Death.....	187
2.	Name in FULL?....	
3.	Age?.....	Years..... Months..... Days
4.	Place of Death?....	
5.	Street and No?....	
6.	Sex?.....	
7.	Color?	
8.	Condition?....	
9.	Occupation?.....	
10.	Place of Birth?....	
11.	Father's Name?....	
12.	Mother's Name?....	
13.	Parent's Birthplace? Fa..... Mo	
14.	Where Buried	

.....INFORMANT.

N. B.—At No. 4, give city or town and village. At No. 5, if no street, state what part of school district. At No. 8, state whether married or single, widow or widower. At No. 13, state the country in which each parent was born.

PHYSICIAN'S CERTIFICATE.

1.	Name?.....	
2.	Date of Death?	187
3.	Disease? Primary.....	
4.	“ Secondary.....	
5.	Immediate Cause of Death?.....	
6.	Sanitary Surroundings: Good?..... Bad?..... Average?	
7.	Duration of Disease? Primary..... Secondary.....	

.....PHYSICIAN.

N. B.—At No. 5, state whether from exhaustion, paralysis, suffocation or what. At No. 6, state yes or no to the questions. For out doors make sign, + over reply. For out and in both make sign, —.

I certify that the above is a true return, to the best of my belief.

.....UNDERTAKER.

.....18

[REVERSE.]

EXTRACT FROM CHAPTER 77 OF THE GENERAL STATUTES OF 1872, "OF THE REGISTRATION OF BIRTHS, DEATHS AND MARRIAGES," AS AMENDED BY CHAPTER 488, PASSED MAY SESSION, 1875.

SECTION 2. Section 6 of said Chapter 77 is hereby amended so as to read as follows: "Whenever any person shall die, or any still-born child shall be brought forth in this State, it shall be the duty of the physician attending at such bringing forth or last sickness, if any physician so attended, within forty-eight hours after such death or bringing forth, to leave with the family, if any, or person having the care of the deceased or the person bringing forth such still-born child, or to give to the undertaker or person who conducts the funeral, a certificate stating, in case of a death, the name of the deceased, the date of the death and the disease or cause of the death, and in case of the bringing forth of a still-born child, the date and the cause of such child being brought forth still-born."

SEC. 3. Section 8 of said chapter is amended so as to read as follows: "The undertaker, or the person who shall conduct a funeral, or who shall bury or deposit in a tomb, or who shall remove from this State or otherwise dispose of the remains of any deceased person or still-born child, shall first obtain the physician's certificate required by Section 6 of this chapter, if a physician was in attendance upon such person who has deceased, or the person bringing forth such still-born child, and shall return the same, together with his own certificate of the facts required by Section 3, as hereby amended, on or before the second Monday of the next succeeding month to the clerk of the town where such death or bringing forth took place."

SEC. 11. If any clergyman, physician, undertaker, town clerk, clerk of any meeting of the Society of Friends, or other persons, shall willfully neglect or refuse to perform any of the duties imposed on, or required of him, by this chapter, he shall, at the discretion of the court trying the cause, be fined not exceeding twenty dollars for each offence, one-half thereof to the use of the town in which the offence shall occur, the other half to the use of the person who shall complain of the same.

SEC. 12. In order that it may be more surely ascertained, that no clergyman, physician, undertaker, coroner, or clerk of the Society of Friends, neglects to make the returns specified in this chapter, each of the said parties shall cause his name and residence to be recorded, in the clerk's office of the town where he resides.

N. B.—For the purpose of securing more correct registration of deaths, the Secretary of the State Board of Health is instructed to make complaint of any violation of the law in relation thereto. Incomplete returns will be returned for correction, unless the reason therefor is given on the return.

How best to secure complete returns of all the deaths in the State, and obtain accurate accounts of the causes of death, and the circumstances surrounding all cases of preventable diseases, is the great question for solution.

It seems, however, very evident that at least one additional provision can be made to our vital registration laws, which will go very far toward remedying the evil of neglect in the return of deaths, and especially of cases not attended by a responsible physician or buried by an undertaker.

And that is the requirement of a burial permit before interment, in every case of death, or a removal permit if such is desired, in all the towns in the State, the same that is required in the cities and some of the more thickly settled towns.

These permits might be granted by town clerks, and all members of town councils, all health officers of a town, and if in the judgment of the town council, thought advisable for convenience, the trustees of school districts, all of whom should be required to make report of the same.

PLANS OF WORK.

It is the design of the Secretary of the Board to endeavor to obtain from physicians and clerks of local boards of health in all the towns in the State, a MONTHLY STATEMENT of the diseases most prevalent in their respective localities, during the month, together with the general degree of severity, and the comparative mortality; the rainfall; the condition of the soil in regard to moisture or aridity, during the month, and different weeks in the month; the average temperature of the atmosphere, whether the weather has been subject to sudden changes, and the degree of change, the condition of vegetation (if in the warm season) as to luxuriance or feebleness; the fruit, potato, cereal and grass crops in particular, as to mildew, mould, rust, smut or blight; the prevalence of any unusual kind of sickness, with its characteristics and rate of mortality; the relative amount of general or particular sickness, with proportionate death rate, compared with the average of the corresponding month of previous years; the noted absence of ordinarily prevalent diseases of the month, together with statements of facts regarding the prevalence of contagious diseases occasioned by communicability, and suggestions as to the causes of general or particular diseases, and especially those causes of disease

which are believed to be removable. Such statements of facts as are suggested above, from a single small area of observation would, as elsewhere remarked, be of little value, but reported from many locations, and comprising all the towns in the State, will, when properly classified and arranged, become a valuable basis for sanitary study and generalization, and afford great aid in the suggestion of other and better methods, for the observation and detection of new facts.

Sanitary observations must necessarily extend over a considerable territorial area, comprising cities, towns, and villages, neither of which alone can furnish all the facts absolutely needed for full generalization.

In order to secure the coöperation of intelligent observers in different sections of the State, and especially such as by professional culture and experience, are better fitted for sanitary observation, the following circular (letter A) was sent to a considerable number of the medical profession, of prominence in their respective localities, and embracing all the towns of the State:

(CIRCULAR A.)

OFFICE OF THE STATE BOARD OF HEALTH,

17 COLLEGE STREET, PROVIDENCE, R. I.

DEAR SIR:—The Rhode Island State Board of Health, desires reliable correspondents among practitioners of medicine, in all the sections and localities of the State. The work required of correspondents, will be replies to such circulars of inquiry, as may be sent to them, and statements of facts concerning the presence, and presumable causes of disease, which have come to their knowledge. It is especially desired, that the prevalence in any locality of severe forms of zymotic diseases, and any suspected cause or causes of such diseases, endemic or epidemic, should be promptly reported, and at least semi-monthly reports continued, during the prevalence of such diseases, to the Secretary of the Board.

It is the intention of the Secretary, to prepare a *Sanitary Map* of the State, which will show not only the chorographical outlines of towns and school districts, but also the topographical and geological features and characteristics, of sections of cities, and school districts. It is desirable to learn the location, in all sub sections, of the natural ponds, drainable reservoirs, swamps, marshes, streams of water of any considerable size, etc., etc. Correspondents may therefore be called upon for a description of their section of territory. Envelopes and blanks will be furnished, and all postage expenses defrayed by the Secretary. Abstracts of such replies, statements, and reports, will form a part of the basis of the annual reports of the Board.

Correspondents who are unwilling their names should be used as contributors, should so state at the bottom of every report or reply, which they desire should be confidential.

In return, correspondents will receive all the Annual Reports of the Board, the Annual Registration Reports, and all circulars for popular dissemination of sanitary knowledge. They will also, thereby, discharge a just duty to their patrons and the State.

If, therefore, you feel disposed to aid the Board in the work of investigating the causes of disease, and acquiring a knowledge of the means of prevention, and are willing to be placed on the list of regular correspondents, of the State Board, you will please write your name and P. O. address on the enclosed postal card, and transmit to the Secretary by mail.

CHAS. H. FISHER, Secretary.

In response to the above circular, about sixty members of the medical profession signified their willingness to act as regular correspondents of the Board. Every one of these individuals, is a person of responsibility and high intelligence, many of them occupying positions of trust and honor, in their respective towns, and together they represent every section of the State. Upon them great reliance will be placed, in regard to the reports and statements, which it is expected they will make from time to time to the Secretary of the Board.

REGISTRATION OF DISEASE.

The *registration of disease* from carefully recorded returns, must, in the not far future, become a valuable help in ascertaining the laws of life, of health and disease. Notwithstanding, such registration has not hitherto been successfully accomplished, or indeed very earnestly attempted, it must, in the nature of things, be of especial value, when properly performed; *i. e.*, with careful statement in the returns, all the attendant circumstances of constitution and condition of soil, where disease occurs, the surrounding circumstances in regard to the presence or absence of filth, the house, surface, and soil drainage, the source and quality of the drinking water, the internal condition of the dwelling and cellar, including the means of ventilation, lighting and warming, the arfaction of bedding, clothing, walls and floors; whether dwelling of brick, wood or stone; habits of family, habits of invalid; occupation of invalid and condition of place of labor; diathetic condition of invalid and connection with previous diseases.

SANITARY OBSERVATION.

Sanitary observation and inquiry with a record of the same for report, as suggested above, will, without question, in the not far future, enter more largely into the daily practice, of the intelligent and qualified practitioner of medicine, as a means of ascertaining the cause and nature of the diseases with which he is contending. A report of the facts obtained by such inquiry and observation from a large number of intelligent practitioners, classified and tabulated, would afford a valuable means of comparison, and help dispel the mists and darkness that have hitherto hung over so many obscure maladies. It may seem like groping in the dark, but it must be remembered, that much of what is positively known, as scientific knowledge, has been reached, only by groping blindly through many devious ways, and over many stumbling-blocks. In the discovery of the causes of many diseases, we are, and shall hereafter be obliged, to proceed from the known to the unknown; by comparison of known facts, we come in possession of definite propositions, and reasonable premises for the deduction of logical inferences, just as the astronomer, by the perturbations of some celestial body, infers the existence of some other body of like character in its immediate vicinity, and thus, moved by his reasoning, makes persistent search, and is rewarded by the discovery of the previously unknown or unseen body.

It is a common observation among physicians, that locations vary greatly in the peculiar characteristics they give the diseases occurring in them, not the endemic alone, but frequently, distinctive characteristics among the manifold types and grades of common diseases, which, if not apparent, are reasonably believed to be dependent on some local cause unknown. These characteristics in many cases, make all the difference between life and death. Will it be said the causes of such characteristics cannot be discovered? or if found cannot be removed?

It has seemed to me, that in order to determine with any fair degree of exactitude, the influence of local conditions upon the production or virulence of disease, especially such as might be dependent on the natural features of any location, that there should be a sanitary survey of the State, chorographical, topographical and geological. Such a survey would result in the production of a set of

SANITARY MAPS OR CHARTS

of every township in the State. Each township should be divided topographically into sections; wards in cities, and school districts in towns where they exist would answer very well. On these maps should be shown the geographical features, the boundaries of sea-coast and tide-water, when existing; the course of rivers, the ponds, the ranges of hills and their altitude and direction, the large plains, the deeper valleys, the low wet lands and swamps, the forests and wooded lands. The topographical features should show the location of villages, the location, size and kind of manufacturing establishments, the boundaries of wards in the cities and school districts in the towns.

With a township map, say two by three feet in dimensions, having the foregoing specifications for a basis, the geological formations may be designated by various transparent colors, and with dots, or lines with different inclinations to distinguish surface soil, subsoil or underlying rock. Arbitrary characters, letters and figures, may be used to denote the average humidity or aridity of the soil, the source and kind of water supply, the facilities of surface or sewer drainage, the location of special deposits of vegetable and animal refuse and excreta, and such industrial establishments as are believed to be detrimental to the health of the public in their immediate vicinity.

Reports from physicians of disease or death, with a few facts connected therewith, stating what part or location in any certain town section, school district, village or ward the disease or death occurred, and received by some officer appointed for that purpose, and with the map before him, could be easily classified and compared, in connection with the geological formations and conditions, and the local surroundings. By such an arrangement the physician would be relieved of a very considerable amount of irksome labor, and could with very little time and attention, report every month upon the back of a postal card having upon it printed questions for the purpose, the said postal to be furnished by the State free of expense. The summing up of the facts, derived from such reports for a series of years, must certainly furnish very reliable data, for deducing conclusions in regard to many of the vexing problems, now presented the profession for solution.

By reports like those alluded to above, and by returns of deaths and causes of deaths as now and may be hereafter required by law, the physician can serve beneficently the State, and meet one of its just claims, and also serve humanity.

DISSEMINATION OF INFORMATION.

It is the purpose of the Board to "publish and circulate from time to time, such information as they may deem to be important and useful for diffusion among the people of the State, in such form as shall be least expensive, and reach the largest number of citizens. In pursuance of the same, there was prepared and published in the month of June, ten thousand copies of a four page tract, which was as follows:

OFFICE OF THE STATE BOARD OF HEALTH.

PRACTICAL SANITARY HINTS.

PUBLIC HEALTH TRACT No. 1.

The advancing heat of summer warns us to take reasonable precautions against the advent of those destructive diseases of the season, that every year carry so many into untimely graves.

These diseases: Diarrhea, Dysentery, Cholera, Cholera Morbus, Cholera-Infantum, Typhoid Fever, etc., are almost wholly affections of some portion of the intestinal canal. Such being the facts, the natural inference would be, that they were caused by some errors of diet and regimen. While it is true these play a very important part in the production of disease, there are other morbid materials, which, absorbed into the body by the lungs or skin, or taken into the stomach, become equally active agents directly or indirectly, in the causation of disease. Among them are the noxious gases, gaseous poisons and disease germs or particles, that float in the atmosphere or in the water we drink. Now, whether disease arises from the inception of minute living germs, or poisonous inorganic particles, or poisonous gaseous fluids, it is known beyond question, that whatever the agents are, they may and do emanate from fermenting and putrifying decomposition of animal and vegetable refuse.

FILTH,

wherever found, on the surface or in sewers, soil pipes, sink drains, cesspools, privies, pigsties, house yards, courts, alleys or cellars, is a prolific head source of much of the suffering and disease that affects humanity. The destructive influences of the effluvia of decomposing filth, have been far too little known, and therefore too little regarded, by the general public. While from their baneful effects none are exempt, their direst influences are visited upon those of least vital resistance, namely, children and invalids. The heat of summer greatly favors decomposition of all refuse matter, and many a child and invalid, will be laid away in the graveyard, during the present heated period of the year, the victim of summer disease caused wholly or in part by the gases of putrifying filth. We rush to the rescue of drowning men, we intercept the blind walking toward the

edge of a wharf or precipice; why neglect to rescue the multitude from death little less certain, and much more painful and lingering?

In the cities with compact population great care must be taken to *remove wholly* all manner of decaying rubbish, garbage or vegetable refuse to places where it may be out of harm's way, or be utilized or reduced to ashes. Removal is far better than disinfection, which is quite uncertain, and deodorization, which is in most cases more or less incomplete. Heating or burning is the most absolutely effectual appliance. Where high degrees of heat cannot be applied, and frequent removal is impossible, then deodorizers and disinfectants must be freely employed, every three or four or more days as occasion may demand.

USE OF DEODORIZERS AND DISINFECTANTS.

A few only of these agents need be named. For privies, cesspools and open sink drains, one pound of Sulphate of Iron (green vitriol or copperas) to one gallon of hot water should be freely applied to every inch of surface, with a whisk broom or sprinkler, or a coating of wood ashes, or sifted hard coal ashes, perfectly dry from time of burning, should be as frequently applied as suggested above. These articles are nearly, and perhaps quite as effectual as any others, and have the advantages of extreme cheapness, perfect safety in use, freedom from odor, and convenience of obtainment everywhere. One pint of Liquor Chloride of Zinc in two gallons water, in one pail, and one pound of Chloride of Lime in another pail full of water, applied as above, the second immediately after the first, will very nearly if not effectually destroy all the odors of putrefaction. One pound of crude Carbolic Acid (sold in pound cans) to twenty gallons water, used in the same way, will produce like results. The Carbolic Acid solution just mentioned, one gallon added to the Sulphate of Iron solution two gallons, will make a very effectual application. And so also the Chloride of Lime solution followed by the Sulphate of Iron solution. The Liquor Chloride of Zinc, having no odor of itself, makes a very agreeable as well as effectual wash for deodorizing sinks, sink spouts and closed sink drains; should be used, one pint to three or four gallons of water.

Most of the solutions above named will corrode tin vessels, if kept in them long, destroy colors of cloths or paints upon which they remain in contact, and the copperas will spot white and colored cloths, and white colors generally, all of which may be avoided by care. Earthen or unpainted wooden vessels should be employed for large or long use.

VENTILATION OF SOIL AND SEWER PIPES.

All closed cesspools, sink or soil drains and sewer pipes, should be ventilated outside the house, by ventilating tubes or pipes opening above the eaves. Water traps of every kind have been found insufficient, in any kind of unventilated pipe or sewer, to prevent the inflow of poisonous gases, by permeation through the fluid of the traps, from the expansive force of the gas, and the lighter air of heated rooms.

Outside the cities and more compact and larger villages, the dangers from the effluvia of cesspools, privies and other out-door decaying filth, are commonly supposed to be less, because more widely separated, and more largely diffused

and dissipated in the common air; but if these were facts, they by no means imply the absence of danger, or exemption from the necessity of the employment of the same measures recommended above; because, while the effluvia of filth may be so diluted by large volumes of pure air as to be practically less observable and perhaps less harmful, except when in its immediate current, there is another danger, less suspected but not less deadly in its noxious effects.

CONTAMINATED WELL WATER.

There is death in the well. Subtle poisons may lurk in the well water, unperceivable to sight, smell or taste. Wells, it must be borne in mind, drain an area of surface around them, in ordinary soils, of a distance equal to their entire depth, and may drain directly from sources of pollution a distance of many times their depth, by strata of rock or clay, inclining toward them, though the surface drainage or inclination may be away from them. It will be evident that the danger will be very considerable, from privies, cesspools and all other collections of putrifying filth within a distance at least equal to the depth of the well, which are either upon the surface, or nothing but openings or holes or depressions in the soil, subjected to the heats of summer, and leached day after day by rainfalls and the usual fluids, the resulting polluted and pestiferous lye, percolating through the underlying earth down to the bottom of the well. While soils are to some extent the natural filterers and purifiers of water, some are but slightly such, and none can wholly filter out the subtle poisons that result from putrefactive decomposition of accumulated filth. For such accumulations, until better arrangements can be made, prompt and frequent removal and complete disinfection while remaining, are imperatively demanded for safety to life. On premises where no abundant water supply is obtainable, with free drainage by sewerage, by which all night soil, house refuse and filth may be completely conveyed beyond harm, all privy vaults, cesspools and other receptacles of filth should have free ventilation and be water tight, their contents kept from fermentation by dry earth, dry unleached ashes or copperas, or carbolic acid solution, and their contents promptly removed. Barrels that are strong and tight may be cut in two in the middle, and each half used, slid beneath or hung inside of privy vaults, or water-tight boxes of size requiring frequent removal, used in the same way. If the contents are to be used for fertilization, the carbolic acid solution should be omitted.

UNCLEANLY CELLARS.

There is another source of danger to life in the cellars. Death has come through the cellar to slay thousands upon thousands. Cellars with soil bottom must of necessity be damp, because like wells they drain the earth around them. Cellars that retain water for some weeks and are muddy a considerable part of the year, are among the most hazardous of household dangers. There is a kind of exhalation from the earthy bottom of such cellars, independent of any filth, called ground air, which is very detrimental to human health and especially promotive of pulmonary consumption. All cellars should be kept dry as possible by thorough drainage. But the warmth and moisture of all cellars, however well drained or cemented or both, favors the decomposition of the refuse of storage

vegetables, and whatever droppings there may be of meats, butter, lard, cheese, or other animal products, and which emit gases dangerous to life. A prominent physician reports the occurrence in the north part of the State of twenty-seven cases of severe typhoid fever, some of them fatal, the direct result of the unhealthy influences of a damp and uncleanly cellar.

To prevent the emission of ground air or soil moisture from the cellar bottom or sides, the sides must be laid in good hydraulic or asphaltic cement, and the bottom in the same, or in alternate layers of asphaltic cement and felt saturated with bitumen. Good ventilation, however, will greatly obviate the necessity of cementing, but absolute cleanliness is indispensable. As the warm season approaches, sweep up and remove every particle of refuse, let in plenty of light and air, wash the walls with a solution of copperas, (one pound to a pailful of boiling water,) first with a stiff broom and then with a mop, and finish with a thorough whitewash of lime.

NEGLECTED PROVISION CLOSETS.

Disease is also sometimes caused by half cleaned or neglected cupboards, closets, pantries, or provision rooms, where bits and crumbs are left to decay.

It is not necessary, however, that contaminated water, or the effluvia of sur. face or pooled filth, or uncleanly cellars or pantries, should be sufficiently poisonous, to produce *directly* and obviously the common diseases of summer, to be sources of danger; for other derangements of the human economy, varying with the constitutional peculiarities of individuals, may be as easily induced by the same causes; and in the absence of any or all acute diseases, it is quite probable that very many of the obscure ailments of numerous persons, not immediately dangerous, have the same origin, and are consequently so perpetuated; making the victim's life almost intolerable with aches and pains, and functional disturbances of the nervous system, the stomach, bowels, kidneys and other organs, almost endless.

The great, the indispensable remedy is cleanliness, and not only of inanimate but of animate bodies also, for filth is the same disease-producing agent, whether upon the surface of the earth, or in or about the habitations of man, or incrustated upon the surface of human bodies.

HEAT AS A CAUSE OF DISEASE.

Among other agents directly promotive of summer diseases, notwithstanding the apparent exceptions, high degrees of atmospheric heat hold an important place. The sudden advent or a long continued high degree of heat debilitates the nervous system and digestive organs of susceptible persons, and persons reduced by fatigue or other causes, consequently, indulgence in the same quality and quantity of food, ordinarily taken with impunity, would be oftener followed by indigestion and some form of derangement of the stomach and bowels, resulting in congestion or inflammation of a higher or lesser degree. The preventive is obviously a sparer, more nourishing and more easily digestible diet. Of the diseases of summer, Cholera Infantum is the one most fatal and most intractable. This disease seemingly holds a very steady and definite relation to high degrees, or sudden alternations of heat. The greatest care must be taken to adapt the

quantity and quality of the food of young children, to the varying conditions of the atmosphere. Instead of waiting until serious illness occurs to call the family physician, let him be called early, to prescribe, not drugs, but modes of management of diet, exercise, exposure, clothing, and personal cleanliness to meet the varying changes of the season; and among, and not the least of the duties of the physician, will be the sanitary inspection of the dwelling, the water used, and the surrounding premises. It seems hardly necessary to allude to the dangers of eating unripe fruits and vegetables, the drinking largely of iced beverages, exposure to damp and cool evening air thinly clad, or lying on the ground in cool places, and especially sleeping with insufficient covering in open rooms, subjected to the frequent sudden cooling of the night air. An ounce of prevention is better and far cheaper than a pound of cure.

This tract was circulated freely in every portion of the State, and by reason of the influx of summer visitors, at the numerous places of resort by the seaside, and on Narragansett Bay, found its way into distant States and cities, and many letters of commendation were received by the Secretary from parties in the middle and western States.

Several applications for packages of from fifty to one thousand, were received with tender of payment, but none could be furnished, as they had been distributed in the State. Leave was given in one instance to republish, to a party in one of the smaller cities of New York.

In November, the Secretary was authorized to prepare the manuscript of another four page tract. This was done, and at a subsequent meeting of the Board, the Secretary was ordered to procure the printing of ten thousand copies for popular distribution. This tract was as follows:

FROM THE OFFICE OF THE R. I. STATE BOARD OF HEALTH.

RESTRICTION AND PREVENTION OF SCARLET FEVER, DIPHTHERIA, SMALL POX, AND OTHER INFEC- TIOUS DISEASES.

PUBLIC HEALTH TRACT No. 2.

Good personal health, is the foundation of individual enterprise and success. Individual health in the aggregate, is public health.

Good public health, is the essentially solid basis of national energy and prosperity.

A nation of invalids is already in its decline. A nation of universally able-bodied citizens, in the fullness of physical and mental health may defy adversity.

How to prevent the occurrence of disease, and acquire, and preserve good health, is one of the most important studies of modern times. It is not only engaging the attention of the Medical Profession, but also that of advanced and thoughtful minds in every community.

Fortunately it is one, in which every intelligent individual can readily engage, and also one, which every person is under imperative moral obligations to pursue.

No person can rightfully allow himself, his family, or his neighbor to become sick, when such sickness can be prevented by reasonable precautions.

The design of this tract is to show in what way, many cases of contagious disease, may be prevented from spreading through a whole community, or lighting up the disease at some future time or in some distant place, by restricting the infection to the original cases.

The directions given will have particular reference to Scarlet Fever. This disease is also popularly known under the different other names of Canker Rash, Scarlet Rash, Putrid Sore Throat, Scarlatina, etc., all and singular of which are produced by one and the same poison, and are capable of reproducing the same, and consequently infecting other persons with the same disease.

It is not a long time since prominent physicians had doubts of the contagiousness of Scarlet Fever. The proofs of communicability, have however so multiplied in a few years of close observation and investigation, that the question seems now to be definitely settled.

Scarlet Fever is caused by the introduction within the body through the lungs, stomach or skin, of specific poisonous particles of matter, or organic germs. Individuals vary greatly in their readiness to receptivity of the disease germs, and their susceptibility to the effects of the inceptive action. But whatever the degree of the disease, the same poisonous germs are reproduced, with equal power to produce the disease in other persons.

The excretions or waste material from the bowels, kidneys, skin, lungs, mouth, and nostrils, contain and carry out of, and away from the body, these particles or germs of the disease, which are so exceedingly minute in size, that they have never yet been detected by microscopic observation, and so light, as to float in the air for long periods of time, and for long distances, without having their poisonous qualities or vitality destroyed, by the moisture or dryness, the heat or cold, or the ordinary gases of the atmosphere.

These germs, by their exceeding lightness, may separate from any of the emanations from the body, either after having been thrown out upon the surface of the ground, and rising therefrom to be wafted away in the currents of the air, to infect some other person or persons, weeks or months afterwards, and scores of miles away, or, separating immediately in the sick chamber from the breath, perspiration, scaling off, or other discharges from the body, may rise and floating about in the room, infect some unwary caller, or find lodgment in some nook or crevice, or on some shelf, moulding, sash, ornament, curtain, drapery or other clothing, to be again dislodged from their resting places weeks, months or years afterwards, to affect some casual visitor or new occupant, or be carried away in articles of furniture, ornament, or wearing apparel, to spread infection and carry dismay to other persons, and in other localities.

Scarlet fever is one of the most fatal of contagious diseases.

By the census of the United States for 1870, the mortality from this disease for the previous twenty years, is stated to average about one to every twenty from all other causes.

But it is needless to go to statistics, to prove the necessity of all reasonable attempts to check the progress of the malady.

When, therefore, it is ascertained, that a member of the family is affected with the disease, let the following directions be observed and carried out, as far as circumstances will permit, under the supervision, and modification, when needed, of the physician in attendance.

A close observance of them will be attended with considerable labor and inconvenience, but it must not be forgotten, that no person has a right to injure his own family, his neighbor, or his fellow man anywhere, by willful or indolent neglect of known duties.

1. *Entire separation of the sick from all other persons*, except such as are absolutely required for attendance and nursing. Nothing can compensate for this precaution, for the restriction of the disease, and the welfare of the patient.

2. *The patient should be taken to a dry, well ventilated, and properly prepared apartment.* An upper room is dryer, and safer as well as more airy than one near the ground. The thermometer should be kept between 68° and 72° F., as nearly as possible during the heated stage, and about 76° thereafter.

All furniture not really needed, all ornaments, pictures, books and maps, all valuable carpets, drapery or other cloth material that might be damaged by fumigation or disinfection, and all furniture upholstered with cloth, should be entirely removed.

All large furniture not removable except with great difficulty, may, however, be covered with paper, and the paper covered with cloth, all which can be carefully removed and destroyed after the termination of the sickness.

Pieces of carpet and old rugs may be used to cover the naked floor and disposed of as above, or disinfected by fumigation or heat. Fresh air should have free access to the room, special care being taken to protect the patient from currents or drafts, or sudden introduction of large volumes of air of lower temperature than that of the room.

3. *The bed provided should be elastic and cool.* Soft feather beds, or any into which the body of the patient sinks, are entirely inadmissible. Rubber sheets or other covering of firm material, laid over the bedding, drawn tight, and securely fastened to the sides of the bedstead, to prevent sinking down of the body, should be used when mattresses cannot be obtained. Rubber sheeting, properly applied, is a very effectual protection of the under bedding.

4. *Attention to cleanliness and disinfection is indispensable.* The body and bed linen, and all larger clothes, should be frequently changed and immediately on removal, immersed in vessels containing a disinfecting solution, (Liquor Sodæ Chlorinatæ one quart, water four gallons,) which should be kept in or near the room for the purpose of retaining soiled clothes until opportunity occurs for thoroughly boiling for at least one hour.

Heat above the boiling point, whether by boiling or baking, is a powerful disinfectant, and effectually destructive of contagion germs. The clothing of nurses and attendants should also be disinfected before coming in contact with persons liable to infection, and the above precautions should be continued until the period of peeling or scaling of crumbled scurf skin has ceased. *These fine branny or mealy scales are especially dangerous as carriers of the contagium of Scarlet Fever.*

Cotton clothing is much better than woolen for use in the sick room, being less likely to entangle and hold the scales or germs of contagion, and also more easily disinfected.

The hands should be washed with Carbolic Acid Soap, or in diluted Chlorine Water, (one ounce to half pint of water,) or diluted Bromo Chloralum, (one ounce to half pint of water). The last is free from any odor. The body of the patient should be bathed at least once in twenty-four hours in the solution (Liquor Sodæ Chlorinatæ one-half ounce, water one pint,) until cessation of peeling.

5. *All the larger discharges from the nose or mouth, and all the stools and passages of water, should fall into vessels containing at least a half pint of a solution of green copperas, (one pound copperas to one gallon of hot water,) and carried at once to some distance from the house and covered if possible with a light coating of dry earth. Keep out of streams of water, and away from the vicinity of wells. If water closets or privies must be used, let them be frequently and thoroughly disinfected. (See Public Health Tract No. 1.)*

Good napkins and handkerchiefs should not be used for the smaller discharges from the mouth and nose, but instead small pieces of cotton cloths, which may be burned immediately after use.

While good ventilation is indispensable in the sick room, some benefit may doubtless be derived from the diffusion therein, of some disinfecting gas like chlorine or ozone. Saucers partly filled with Chloride of Lime may be set in different places in the room upon which a teaspoonful or two of good sharp vinegar may be turned every three or four hours. The Lime should be renewed when it ceases to give off the gas. Cloths may be wet with Liquor Sodæ Chlorinatæ (one part to three of water,) or if Chlorine gas is very offensive to the patient or attendants, the cloths may be wet with the Bromo Chloralum, which is without odor, (one part to four of water,) and hung up in different parts of the apartment.

6. *After the complete termination of the disease, all the contents of the sick chamber, all the material of every kind whatever, used during the sickness and remaining in the room unprotected, and the floor, walls, windows and ceiling of the room should be thoroughly disinfected by washing, fumigation or heat. Whatever is of small value had better be burned. The rooms should be washed thoroughly in every part with the following solution: (Sulphate Zinc, half a pound, crude Carbolic Acid one ounce, hot water, two gallons.) When practicable, the walls and ceilings, should be lime washed or kalsomined.*

To fumigate a room with Sulphurous Acid gas, the contents must be so arranged that the fumes may come in contact with the entire surfaces of all the articles to be disinfected, as well as sides of the apartment.

Across a tub partly filled with water, place a pair of tongs or other support, for an iron basin or skillet, or thick earthen pan. Put in the basin or pan, a layer of ashes one inch thick, then a few bright live coals, upon which scatter at least one pound of powdered or crushed sulphur. Close the apartment tight, and leave for twenty-four hours. Then ventilate freely.

To disinfect with heat alone, large ovens must be used, and the temperature carried up to a degree, at which bread would be rapidly baked, and continued for one hour.

In case of death, the body should be wrapped in large cloths, thoroughly saturated with a strong solution of Chloride of Lime or Soda and placed in a coffin as soon as possible.

Funerals of persons dying of contagious diseases, had better be held elsewhere, than at the residences of the deceased, and an open coffin should never be allowed.

Whenever a virulent contagious disease occurs in any community, it is the duty of all citizens to coöperate with the afflicted family, in repelling the attack of the invader, and confining the disease to the first cases.

To avoid attacks of infectious diseases, the directions suggested in Public Health Tract No. 1 should be strictly observed. Breathing air containing sewer gas, or any gases of decay, or exhalations from any form of filth, in cesspools, water closets, sinks, foul cellars, or uncleansed animal bodies, or repeatedly re-breathing one's own breath, or the breath of others in closed rooms, *especially in closed bed-rooms through the night*, are unfailing sources of deterioration of general health, and whatever impairs general health, lessens the natural vigor of the individual, lessens the power of resisting the attacks of any disease, and especially predisposes to attacks of infectious maladies, like Scarlet Fever and Diphtheria, and also greatly increases the liability of death.

While the above suggestions have particular reference to Scarlet Fever, many of them will apply equally well to other forms of contagious diseases. Small Pox preëminently, requires the same management.

Paragraphs numbered one, two and three, are applicable to nearly all forms of dangerous maladies, while *the first section of paragraph 5 has especial applicability to typhoid fever, and nearly all will apply equally well to diphtheria.*

Doubtless some will question the necessity of such sweeping precautions, but it may be suggested that to the neglect of such precautions, may be due in a great measure, the continued existence of infectious diseases, whether in isolated or in epidemic visitations, and if preventable diseases are ever to be stamped out of existence, it can be accomplished only by such vigorous measures, as will effect the destruction of the disease producing germs, in their infancy.

The word "*germ*" was used in the above tract, as being probably the best, to convey to the mind of the average reader, the idea of a

minute material particle or atom, which is the individual contagium, whether organic or inorganic, that causes the disease, and not as a *vital organism* whose existence has been demonstrated.

This tract will doubtless challenge criticism. It is hoped it will excite sufficient interest to lead to extended investigation. It was written with deliberation, with consultation of Reports of the Medical Officers of the Privy Council of England, and of many of the leading medical authorities of Europe and America. It will stand.

Other tracts may follow from time to time, and information will also be given by circulars or otherwise, to such parties as may seem, on account of official position, to need specific instructions.

CATTLE COMMISSION.

Upon the organization of the State Board of Health, the duties that had previously devolved on that special board, known as the Cattle Commission, seemed to demand the most immediate attention. The alarming increase of that utterly incurable, and highly contagious disease called glanders or farcy, among the horses of the State, for the previous year or two, had called for prompt and stringent measures for its extirpation or restriction, and the former Cattle Commission, through several agencies, had been moving actively in that direction.

As elsewhere reported, the Board of Health resolved to continue the same agencies until further consideration, and the regulations adopted by the former Commission, were also adopted by the new Board as of their own.

These regulations were ordered to be advertised in several of the newspapers of the State, as had previously been done, and the advertisement was as follows:

RHODE ISLAND STATE BOARD OF HEALTH.

GLANDERS IN HORSES.

At a meeting of the State Board of Health held Monday, April 22, 1878, the following regulations were adopted and ordered to be published:

1. The owners of, or any person having the care of any horse or other animal, knowing the same to have the disease called glanders or farcy, shall keep such horse or other animal apart and separate from all other horses or animals.

2. The owner, or any person having the care of any horse or other animal, knowing the same to have the disease called glanders or farcy shall not lead, nor drive, nor permit such horse or other animal to go in or over any public street, road, lane or highway in this State.

3. Any veterinary surgeon or other person who shall have knowledge of any horse or other animal that has the disease called glanders or farcy, shall report the existence and location of such case of disease, to some member of the State Board of Health within twenty-four hours after receiving knowledge of the same.

The penalty for failure to comply with the above regulations, as fixed by Section 8, Chapter 76, of the General Statutes, is a fine not exceeding three hundred dollars, or imprisonment not exceeding one year.

The first section of the same chapter provides that any person who shall knowingly expose a horse or other animal having any infectious or contagious disease

to other horses or animals not infected with such disease, shall be fined not less than one hundred dollars, nor more than five hundred dollars.

Section 7 provides that any person who shall sell *or offer to sell any horse or other domestic animal* known to him to be infected with any contagious disease, shall be fined not more than one thousand dollars, or be imprisoned not exceeding two years, or both, at the discretion of the court.

Subsequently, the cost of advertising was found to be assuming such large proportions, that some other and more economical way of bringing to the notice of the public at large, the regulations adopted by the Board, seemed to be advisable. At a meeting in which the subject came up for consideration, the suggestion was made that placards, posted in public places, like post offices, stores, livery-stables and repair-shops of various kinds, would be a quite permanent form of advertising, and less expensive than advertising through the newspapers, and the following resolution was adopted:

Resolved, "That the Secretary of the Board be requested to present for the consideration of the Board, at its next meeting, suitable suggestions as to the duties and purposes of the Board, for the information of the people of the State, and also condensed regulations in regard to contagious diseases dangerous to life among animals, to be printed on posters; also, to present samples and styles of posters most suitable for the purpose together with the prices of the same."

At a meeting of the Board on the week following, the Secretary presented a report as directed, and it was voted "that the regulations be adopted, and that they, together with the suggestions to the public in regard to the duties and purposes of the board, be printed, on posters as per samples presented by the Secretary, 500 on plain paper, 500 on cloth and 500 on card-board."

The order was carried out by the Secretary, and the posters read as follows:

STATE BOARD OF HEALTH.

In order that there may be no misapprehension in the public mind in regard to the purposes of this department of State government, attention is called to the following sections of the Act establishing the Board:

SECTION 3. The Board shall take cognizance of the interests of life and health among the citizens of the State; they shall make investigations into the causes of disease, and especially of epidemics and endemics among the people, the sources of mortality, and the effects of localities, employments, conditions and circumstances on the public health, and shall faithfully do all in their power to ascer-

tain the causes and the best means for the prevention of diseases of every kind in the State. They shall publish and circulate, from time to time, such information as they may deem to be important and useful for diffusion among the people of the State, and shall investigate and give advice in relation to such subjects relating to the public health, as may be referred to them by the General Assembly, or by the Governor when the General Assembly is not in session.

SEC. 4. The State Board of Health shall also investigate the subject of diseases among cattle or other animals, and perform all the duties which have been delegated to the Board of Cattle Commissioners in Chapter 76, of the General Statutes of the State.

The work proposed is large in scope and will require extended inquiry and observation. Large immediately beneficial results cannot reasonably be expected. The Board will, however, prosecute the work with all possible diligence. For the accomplishment of its purposes the Board will need the hearty coöperation, not only of physicians, but of intelligent citizens also, in every community. Circulars, each containing a series of questions, will, from time to time, be distributed to regular correspondents in every town in the State, and will eventually cover the whole field of inquiry. The range of questions will be large, and the replies, in all cases, must be the result of intelligent observation. All knowledge is the result of observation, the collection and collation of facts. Sanitary science is no exception. Observed facts elicited from all parts of the State in regard to the prevalence of certain diseases, the accompanying meteorological and geological phenomena, the local conditions as to haze, dust and filth, the decomposition of animal and vegetable refuse, etc., will furnish, when collected, arranged and compared, a basis for sanitary law and judicious sanitary action. It is believed that the Board of Health can become a most efficient arm of State service, and eventually save the State annually from one-quarter of a million dollars upward. To do this there must be an interest on the part of the people. Town boards of health and village health clubs must be formed. Forms of association and methods of investigation will be suggested for such organizations, by the Secretary of the Board when desired.

All persons are requested to communicate the existence of any and all facts or circumstances to them known, prejudicial to the public health, to some member of the State Board or Secretary.

The Board have adopted the following condensed regulations in regard to contagious diseases among domestic animals:

1. No person having the care or ownership of any horse or other animal, having the disease called glanders, or any other disease highly contagious and dangerous to life, shall sell or offer for sale, or permit any such animal to go into or be in any public lane or highway, or expose or keep any such animal within the same building, or within fifty feet of any other animal not so infected.
2. Any person having knowledge of any disease or any facts as set forth in the preceeding section, shall report the same to some member of the State Board of Health immediately.
3. Non-compliance with the above regulations subjects the offender to a fine

not exceeding one thousand dollars, or imprisonment not above one year, or both at discretion of court.

The names and post office address of the members of the Board are as follows: David King, Newport; Elisha Dyer, Jr., Wickford or Providence; Charles H. Fisher, North Scituate; George W. Jenckes, Woonsocket; William T. C. Wardwell, Bristol; Albert G. Sprague, Centreville.

By order of the State Board of Health,

DAVID KING, Chairman.

CHARLES H. FISHER, Secretary.

PROVIDENCE, R. I., May 16, 1878.

It will be seen that the form and phraseology of the new regulations, differs from the others, in that they cover other diseases besides glanders, that the question of a party knowing a horse or other animal to have the disease called glanders, is left to be settled by evidence in court, and the penalties are given in a few lines showing the greatest amount of fine and imprisonment, for any one offence.

These posters were put up in conspicuous places in all parts of the State, and while the expense was less than advertising in the newspapers while that continued, the posters are still a standing advertisement in all the places where put up.

The occurrence of cases of glanders, in locations distant from the Secretary, or other agencies heretofore employed for their effectual disposal, led the Board to adopt the following rule soon after their organization:

"Any member of the Board is authorized, on information received, to order the examination of any animal suspected of having a contagious disease, dangerous to life; and has hereby also authority to order the killing and burying of any such diseased animal, when deemed advisable."

This rule has been of special convenience in several instances, and a saving of expense to the State.

In regard to the examination of horses suspected of having glanders, by veterinary experts, the following rule was adopted:

"The fee of two dollars shall be the maximum sum allowed for the examination of any horse, having or suspected of having the disease called glanders, and such sum for transportation as will cover the expense of nearest public conveyance thereto, except for such cases as shall seem exceptional in the judgment of the Secretary."

It has been suggested, that when any person had suspicions that a horse or other animal of which he was the owner, or had in charge, had glanders or other contagious disease, dangerous to life, he should at once obtain the opinion of some veterinary surgeon, or expert of recognized skill, and that the fee for such examination be paid by the State, as an inducement to early and prompt action. It is probable, however, that if arrangements were made with responsible experts, by which their fees for examining animals suspected of virulent and contagious disease, should be paid out of the State treasury, that there would be many persons who would discover in such arrangement the opportunity for ascertaining from the best veterinary skill, an opinion in regard to some other form of disease from which their animals were suffering, and that without personal expense. Even if the experts were forbidden to give any but negative opinions in regard to the maladies of animals examined, when not proving to have contagious diseases dangerous to life, there would still be opportunities for fraud unless with the restriction that all parties, suspecting their animals of having such diseases, shall apply to any member of the State Board of Health, or its Secretary, or the Agent of the Society for the Prevention of Cruelty to Animals, for an order for such examination. And that is practically the case now. For any person presenting an animal having suspicious symptoms of disease, dangerous to other animals, to any one of the parties above named, can obtain an order for an examination by a responsible expert, and that without expense to the applicant.

The great difficulty, however, in regard to glanders in horses is, that nearly all persons suspecting the disease in an animal which they own, not only do not wish to know the fact themselves, but are extremely anxious it should not be known to others. The intention is to trade off the horse as soon as possible, and realize something, or keep him at work as long as his work will more than pay for keeping.

Horses are sometimes bought by small traders, which are known or fully believed to have glanders, for the purpose of speculation. They are given rest, fed well, have the nostrils sponged with a wash that dries up the secretions temporarily, and are then brought into the market, each with a shiny coat, a clean nose, a good harness on, and attached to a respectable carriage, and some unwary buyer is victimized.

The idea of endangering the health of other animals, or the property of other persons has very little consideration.

AGENCIES EMPLOYED.

As previously reported, the State Board of Health, in assuming the duties of the Cattle Commission, resolved to continue the agencies already employed by the previous Board of Commissioners, until further consideration. Notably among those who had called the attention of the former Commission to the alarming prevalence of glanders among horses, was Dr. N. A. Fisher, General Agent of the Society for the Prevention of Cruelty to Animals, and to him were the Commission chiefly indebted for the discovery of the cases of that disease which came to their knowledge. His position and occupation afford great facilities for that purpose. He was therefore desired by the Secretary of the Board, to continue to render the same assistance he had previously rendered the former Commission, which he readily assented to, and has to the present time, actively coöperated in many ways, to make the work of the Board as effective as possible. His report, dated January 5, 1878, is included in this report, as it gives information which will be of interest to a large number who have never seen the report then given, and is as follows:

R. I. SOCIETY FOR THE PREVENTION OF CRUELTY TO ANIMALS, }
PROVIDENCE, January 5, 1878. }

EDWIN M. SNOW, M. D., *Chairman of Cattle Commission:*

SIR:—Last June we called your attention to the prevalence of glanders and farcy in the city and country. This led to the adoption of measures by the Commissioners to prevent the spread of the disease; and for this purpose you requested that the Agents of this Society should carefully investigate all cases reported to them, or that might come within their observation, giving directions how to dispose of them, and that a record should be kept of the same. This has been done, and the following report will show the results to this date:

But it may be well to state in the first place, that although our statute does not authorize us to interfere when animals are suffering from diseases of any kind, unless connected with them some act of cruelty is alleged, we have always taken particular notice of all cases of glanders or farcy, that have come to our knowledge, and have entered them in our records; consequently we are able to give some idea of the extent to which they prevailed during the six years preceding the last, and we find recorded in all seven cases, as follows: In 1871, none; in '72, one; in '73, two; in '74, three; in '75, one; in '76, none. Of these—all found in the city—five were destroyed, and two were got off into the country before the proper authorities could be moved to secure them.

The whole number of cases of glanders and farcy that have received the attention of the agents of this society from April, 1877, to January, 1878, is twenty-one. Of these, nineteen were killed; one was stolen away after he had been seized by the agent, and one was by permission taken to Massachusetts, where he came from, the owner wishing to try some experiments in the way of treatment, and having given assurance that he should in the meanwhile be placed where he could not endanger other animals.

In eight of the cases, glanders alone was developed; in four, farcy alone; and in nine glanders and farcy existed together. Nine were owned in the city, one in East Providence; one in Pawtucket; one in Centredale; one in Cumberland; one in Burrillville; two in Coventry; five were found on the Cove lands, brought there by the horse traders; two of them from Johnston; one from Cranston; one from Voluntown, Conn.; one from Massachusetts.

Some were in good condition, well used and well cared for; but a majority were old, ill-fed, over-worked and sadly neglected.

How the disease became so prevalent, may be explained, in part, by the following facts: The first four cases were taken from the dealers in old horses; where they came from, or when they came into the State, could not be ascertained; but as they were moved about from place to place, and sold from one dealer to another daily, they no doubt did much to spread the contagion. In June, a circus, with a large number of horses and mules traveled through the different towns, and it was noticed while they were in the city, that many of the animals were affected with something like glanders. It no doubt was glanders, as a few days after it was discovered that the company sold a pair of mules when at Phenix that had the disease in its last stages, and these must have helped to extend it. Thus glandered and farcyed animals have been found worked and driven on the streets, spreading the poison by contact, leaving it at the public watering places, at the hitching and standing places, and wherever they went. In some instances there has been utter neglect to purify the stalls, stables, &c, from which diseased animals have been taken; and much evil has been done by men called "horse doctors," whose ignorance and presumption are only equalled by the confidence of those who employ them. We have found horses, some with glanders in a fearful form, under treatment for catarrh, and others, with swelled legs, discharging from farcy sores, treated for sprains, and in some instances, when the disease was known, it was under treatment by the "doctors," they claiming the ability to cure it, and doing nothing in the meantime to protect sound animals from danger.

The twenty-one cases we have recorded, are not, probably, a quarter of all that have occurred in the State during the year; but they are enough to excite alarm, for of all the diseases to which animals are liable, none is more terrible.

Glanders and farcy are one and the same disease—only different developments of the same specific poison. It is contagious and infectious. Horses and mules seem most obnoxious to it, but other animals and men, may take it by contact; and to all alike it is fatal. Within the last four years, three men in this city and one in Pawtucket, have died of it, the poison having been absorbed through cuts or sores on the hands.

It is difficult to distinguish glanders in its incipient stage from a simple catarrh, and farcy may be mistaken for an injury, or cutaneous affection, not of a dan-

gerous nature. For this reason, and now especially, when the disease is so prevalent, in every case at all resembling it, the best veterinary skill should be consulted. If there is any doubt of its character, the subject should be securely isolated, until it is decided; then, should it prove to be the disease, there is but one course to pursue, the animal should be killed at once and properly buried.

To aid in extirpating the disease, all who have the charge of animals should be induced, if possible, on the least suspicion of its appearance, to have it examined by some one or more competent persons, designated for that purpose, and then be governed by the advice given. If this examination could be had free of charge to the applicant, it would be more likely to be effectual. Much might be done, also, by a careful inspection of public, and in many instances, of private stables from time to time. Then it should be seen, that there is no failure to thoroughly cleanse and disinfect the places that have been occupied by such diseased animals, and all the objects used upon or around them.

We would suggest the importance of some provision being made for the removal and burial of glandered and farcied animals. There are those who are prepared to do it, but it cannot be expected that they will perform such disagreeable and dangerous business, without pay from some one, and the owners who suddenly find themselves deprived of their horses, for no fault of their own, it may be, are often to poor to meet the expense.

N. A. FISHER,

General Agent R. I. Society for the Prevention of Cruelty to Animals.

DISCOVERY AND DISPOSAL OF DISEASED HORSES.

During the eight months the Board has been performing the duties of the Cattle Commission, the Secretary has personally visited twenty-six horses suspected of having glanders, and by his order more than two hundred horses coming into the State in troupes, have been examined as a precaution against the introduction of the disease from without.

The number of cases of glanders or farcy that have died within the knowledge, or been killed by order of, the Board or its agents, since its organization is sixteen. Besides these, information of a reliable character, gives the number of eight more, that have been inspected, killed and buried at the expense of the owner.

Many of the cases of glanders are the property of poor men who would feel it too much of a hardship, and have too little sense of responsibility, to bury the animal in a proper place and manner. It has been found best for the interest of the public, to see that every glandered horse should be buried in such a manner as to prevent the further spread of the disease from that source. Arrangements were

therefore made with Mr. W. E. Barnes of Field's Point, who had acted in the same capacity before, to take away, and properly bury in a secluded spot, upon order of the Board or its agents, all the glandered horses found and condemned in the city of Providence, and surrounding towns; and keep a record of the same, the date of death, the color and probable age, name of owner or party in possession, and last place where kept.

Among those who have rendered valuable assistance to the Board and its agents, in determining positively the character of the maladies of the diseased animals, coming under their observation, mention should be particularly made of Drs. C. H. Peabody, and C. H. Scrutton, veterinary surgeons of the city of Providence, and also Mr. Charles H. Thurber of the same city, and local agent of the Society for the Prevention of Cruelty to Animals, who has had large experience among glandered and farcied horses.

The following report of Dr. N. A. Fisher, for the year ending January 1, 1879, will give a summary of the cases of glanders, that have come within his knowledge during the year, and also presents some valuable suggestions in regard to that insidious and incurable disease:

R. I. SOCIETY FOR THE PREVENTION OF CRUELTY TO ANIMALS, }
PROVIDENCE, January 1, 1879. }

CHARLES H. FISHER, M. D., *Secretary of the State Board of Health:*

SIR:—In compliance with your request the agents of the Rhode Island Society for the Prevention of Cruelty to Animals, have continued to investigate, to dispose of as directed, and to keep a record of all cases of glanders and farcy that have come to their knowledge since the organization of the State Board of Health, as they did previously at the request of Dr. Snow, Chairman of the Cattle Commission, and the following report is submitted for the year ending January 1, 1879:

The number of cases of glanders and farcy that have been investigated or that have come to the personal notice of the agents of the Society for the Prevention of Cruelty to Animals, during the year is twenty-five; of which three died of the disease, and twenty-two were killed. Besides these, we have had reports from reliable persons of eighteen others; making altogether forty-three cases. All were horses.

Ten of these were found in one stable, four in another, three in another, and two each in two others. Eighteen belonged in the city; one in East Providence; one in Warren; two in Pawtucket; one in Cumberland; two in Smithfield; twelve in Cranston; one in Johnston; one in East Greenwich; two in West Greenwich; one in Coventry, and one in Burrillville. This last was brought from Massachusetts to Burrillville and died a few days after. These, we believe, are about all that have occurred in the State.

From these statements it appears that while the disease has been spread over about the same territory, the number of cases has greatly decreased, there having been but forty-three cases this year to one hundred and ten the year previous. This decrease is owing in a large degree, probably, to a better knowledge on the part of those who have the care of horses, of the early symptoms of the disease, and of the importance of a prompt resort to the only means of controlling it; which are—the immediate destruction of the subject, when the evidence of the disease is conclusive, and the careful isolation of all doubtful or suspicious cases. Also to a better observance of general sanitary and suppression measures, such as ventilation, protection from the severities of the weather by proper shelter, blanketing, etc., and the more thorough cleansing and disinfection of stables and stable utensils where the disease has existed.

Undoubtedly more might have been done to lessen the disease had provision been made for a proper inspection of all stables and localities where it made its appearance. The necessity for this does not seem to be appreciated. Fleming, the best authority on this subject, says: "Horses which have been in contact with others suffering from glanders or farcy, or which are suspected in consequence of cohabitation with them, if they do not exhibit any symptoms of the disease, should remain under veterinary surveillance for a certain period, which must not be less than twenty days, and may even be extended to six months. During the shorter period they ought to be frequently inspected—at least once a week. For the twenty days they should not be allowed to mix with other horses; but if after that time, they remain in good health, they may be used in the locality until all apprehension of danger has passed away."

The removal of animals isolated or suspected, should not be permitted without the knowledge and consent of the inspector; nor should any sale of such animals be made without the knowledge on the part of the purchaser that they are under surveillance for glanders or farcy.

We would call your attention to the importance of having early reports of all cases of glanders and farcy. And for this purpose—since it cannot be expected that parties will voluntarily give information which they think may prove injurious to their own interests—to the necessity of such legislation as shall make it the duty, under penalty, of all veterinary practitioners and of all owners and persons having custody of animals, to report promptly all cases of the disease which come to their knowledge, which reports, when it is possible, shall give the name of the owner or person in charge, the time when, and place where found, and how disposed of, together with a description of color, age and condition, and whatever can be learned of its history that may aid in its extirpation.

The burial of glandered and farcied horses found in and near the city, has been done by Mr. Barnes at Field's Point, after the manner prescribed by Dr. Snow, and approved by your Board.

Whenever there has been any question on the part of the owner as to the character of the disease, we have consulted with Drs. Scrutton and Peabody, veterinary surgeons. We have also, in such cases, made examinations post-mortem; and these, in no instance, have failed to satisfy the doubts of all.

N. A. FISHER,

General Agent, R. I. Society for the Prevention of Cruelty to Animals.

CONTAGIOUS DISEASES OF OTHER ANIMALS.

In the foregoing report of the work on the Cattle Commission, reference has been made exclusively to diseases among horses. In regard to the presence of any contagious disease of a serious character among other animals, the Commission have no knowledge of any out break in any part of the State. A few cases of supposed pleuro-pneumonia have been reported, all in single cases and different localities. Texas cattle are still driven through Kansas and into the western States, contrary to law, and diseased animals are frequently found as far east as Albany, but the stringent restrictions put upon the introduction of beef, and other cattle into the States of Massachusetts and Rhode Island, have for some time been so much of a terror, to drovers and cattle merchants, as to arrest the forwarding of diseased animals into either of these States. There have been some deaths among swine, which have excited temporary local alarm. Portions of diseased organs have been brought to the Secretary for inspection, but no evidence has been shown of contagious disease among them. It is believed the State is free from any contagious disease dangerous to life among animals, except that of glanders among horses.

EXPENSES OF THE BOARD.

Envelopes and letter paper.....	\$53 15
Printing circulars, postal cards, &c.....	16 14
Paper and printing 20,000 tracts.....	99 14
“ “ Blank returns of deaths.....	45 74
Stamps and postal cards.....	40 00
Expressage and distribution of documents.....	3 50
Blank books, desk materials, stationery, books, twine, wrap- ping, &c.....	42 06
Six Vols. Sanitarian	20 00
Fuel.....	5 50
Salary.....	830 75
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Board of Health proper.....	\$1,155 98

Cattle Commission.

Advertising.....	\$77 56
Fifteen hundred posters, paper, cloth, and card board.....	36 86
Express and posting.....	10 00
Expenses, veterinary experts... ..	65 50
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Total of bills rendered and certified January 1, 1879. \$1,345 90

The above expenses are less, by one copying-press returned (\$5.75), and transient material on hand, as follows: postal cards and stamps, (\$6.40); five reams and two and one-half quires letter paper; one hundred and eighty envelopes, note size, three hundred and twenty large size, five hundred and fifty yellow note; one quire large wrapping paper; twine and desk material.

The articles furnished the office by order of the Governor, are desk and table accommodations, seating, floor-covering, curtains, and usual articles for sweeping and dusting, and for sink. These are all of the most substantial character, were purchased at greatly reduced prices, and would bring, at this date—after use about eight months—probably first cost. The rest of the furnishing is private property.

BOOKS RECEIVED.

- 21 Vols. from Secretary of State, R. I. Registration Reports.
 2 " " " " " Copy of Gen. Statutes and Public Laws.
 1 " " " " " State Census, 1875.
- 3 Vols. Chicago Reports, Board of Health, 1870-1877.
 5 " Michigan " State Board of Health, 1873-1876.
 1 " " " Vital Statistics, 1872.
 1 " Ohio " " " 1877.
 1 " Colorado " State Board of Health, 1876.
 1 " Reading, Pa., Report, Board of Health, 1877.
 1 " Surgeon-Gen. U. S. Army, Circ. No. 8, Hygiene, U. S. Army.
 1 " " " " " No. 10, Plans for Hospitals.
 1 " Massachusetts Report, State Board of Health for 1878.
 2 " " " " " " " " 1870, Reprint.
 5 " New Haven, Conn., Reports, Board of Health, 1873-1878.
 1 " Connecticut Report, Vital Statistics, 1877.
 5 " New York City Report, Board of Health, 1868 to 1873.
 1 " " " " Sanitary Code of Board of Health.
 1 " New Jersey Report, State Board of Health, 1877.
 1 " " Instructions in Regard to Registry Returns.
 1 " " Hudson County Report, Board of Health.
 1 " Virginia State Board of Health.
 3 " Pennsylvania, Pittsburgh, Reports, Board of Health, 1875-'6-'7.
 1 " U. S. Marine Hospital Service, Nomenclature of Disease.
 1 " Wilmington, Del., Report of Water Engineer on Impurities.
 1 " " " " " Vital Statistics.
 1 " Connecticut Registration Reports.
 4 " Wisconsin, duplicate First and Second, Reports, State Board of Health.
 5 " Sanitarian, Purchased Aug. 26.
 1 " In Numbers for 1878.
 1 " From Sec. State, Mass., Report of Sanitary Com., 1850.
 1 " " " " Board of Health, Mass., Seven Years' Work.
 1 " " Michigan, Report Sec. State Board of Health, 1877.
 1 " " Dist. Columbia, Report Dist. Board of Health, 1877.
- Various Blank Reports and Returns of Births, Marriages and Deaths.
- 1 Vol. by purchase.—Food: Its Value, &c. By H. Letheby, Ph. D.
 1 " " Manual of Practical Hygiene. By E. A. Parker, M. D.
 1 " " Handbook of Hygiene. By George Wilson, M. D.
 1 " " Third Vol. American Public Health Association Reports.

METRIC SYSTEM.

As the *metric system* of weights and measures has intrinsic merit, and is rapidly being adopted by all scientific associations, leading practitioners of medicine and apothecaries, and by contributors to many of the public journals, it seems proper that its terms and equivalents should be brought constantly before the public eye.

The metric system was first suggested by French scientists about the year 1790, with a view of making all measures of length, volume and weight uniform throughout the world. It comprises the following units of measure:

The *meter*, the unit of length = the ten millionth part of the terrestrial meridian, or the distance between the pole and the equator = 39.370432 inches.

The *liter*, the unit of capacity = a cube of the tenth part of a meter = 1.0567454 wine quart.

The *gram*, the unit of weight = the weight of a cubic centimeter of water at its maximum density (4° Cent.) = 15.43234874 grains. In medicine, the *gram* is the unit of weight, and the *cubic centimeter*, or a measure of one gram of water, is the unit of volume; practically the two terms are equivalent, except with very heavy or very light liquids.

EQUIVALENTS.

	<i>Grams.</i>	<i>Grams.</i>
One drachm (Troy) — 480 grains —	31.103	or about 32.
One scruple — 60 grains —	3.888	or about 4.
1 grain —	.0648	or about .06.
$\frac{1}{2}$ grain —	.016	or about .016.
$\frac{1}{4}$ grain —	.008	or about .008.

The average (household) teaspoon holds 5, and the large tablespoon 20 cubic centimeters.

LENGTH.

1 Myriameter,	Mm.	(10,000 m.)	— 6.2137 miles.
1 Kilometer,	Km.	(1,000 m.)	— 0.62137 mile.
1 Hectometer,	Hm.	(100 m.)	— 328.0833 feet.
1 Decameter,	Dm.	(10 m.)	— 32.8083 feet.
1 Meter,	m.	(1 m.)	— 39.37 inches.
1 Decimeter,	dm.	(0.1 m.)	— 3.937 inches.
1 Centimeter,	cm.	(0.01 m.)	— 0.3937 inch.
1 Millimeter,	mm.	(0.001 m.)	— 0.03937 inch.

SURFACE.

1 Hectare,	Ha.	(10,000 sq. m.)	— 2.471 acres.
1 Are,	a.	(100 sq. m.)	— 119.6 square yards.
1 Centare,	ca.	(1 sq. m.)	— 1.550 square inches.

CAPACITY.

1 Kiloliter or Stere,	Kl. or st.	(1,000 l.)	— 1.358 cubic yards.	— 264.17 gallons.
1 Hectoliter,	Hl.	(100 l.)	— 2 bush. and 3.33 pecks.	— 26.417 "
1 Decaliter,	Dl.	(10 l.)	— 9.08 quarts.	— 2.6417 "
1 Liter,	l.	(1 l.)	— 0.908 quart.	— 1.0567 qts. (1.761 imperial pints.)
1 Deciliter,	dl.	(0.1 l.)	— 6.1022 cubic inches.	— 0.845 gill.
1 Centiliter,	cl.	(0.01 l.)	— 0.61022 cubic inch.	— 0.338 fluid ounce.
1 Milliliter,	ml.	(0.001 l.)	— 0.061 cubic inch.	— 0.27 fluid drachm.

WEIGHT.

1 Millier or Tonneau, M. or T.	(1,000 Kg.)	-- 1 Kl. or 1 Cu. m.	-- 2204.6 lbs. (avoirdupois.)
1 Quintal,	Q.	(100 Kg.)	-- 1 Hl. or 0.1 Cu. m.
1 Myriagram,	Mg.	(10 Kg.)	-- 1 Dl. or 10 Cu. dm.
1 Kilogram,	Kg.	(11,000 g.)	-- 1 l. or 1 Cu. dm.
1 Hectogram,	Hg.	(100 g.)	-- 1 dl. or 0.1 Cu. dm.
1 Decagram,	Dg.	(10 g.)	-- 1 cl. or 10 Cu. cm.
1 Gram,	g.	(1 g.)	-- 1 ml. or 1 Cu. cm.
1 Decigram,	dg.	(0.1 g.)	-- 0.1 ml. or 0.1 Cu. cm.
1 Centigram,	cg.	(0.01 g.)	-- 0.01 ml. or 10 Cu. mm.
1 Milligram,	mg.	(0.001 g.)	-- 0.001 ml. or 1 Cu. m.

One kilogram is equal to a weight represented by one liter of distilled water at 4° C. In the centigrade scale 0 (32° + F.) is the freezing point; 100° + (212° + F.) is the boiling point. Five degrees C. corresponds to nine degrees F.

All measures in the metric system are derived from the meter, and their names express their values. Some of the names in the French system (like our "dime") are not in practical use; e. g., hectometer, decagram, etc.

One inch = 2.5 centimeters nearly; one quart (wine measure) = 0.946 liter; one pound troy = 0.373 kilogram; one acre = 0.4046 hectare.

Treatment of the Drowned.

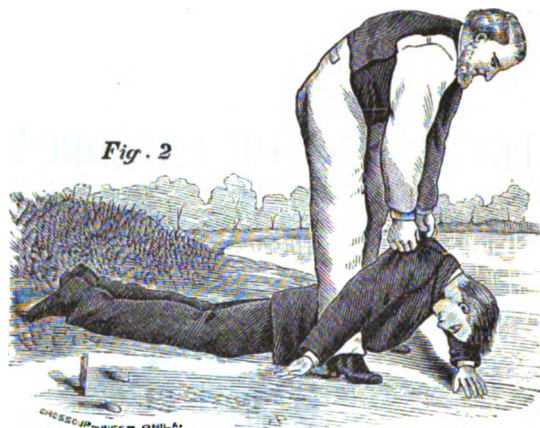
The following methods and rules were devised and prepared by a committee of the Michigan State Board of Health, and are a modification of those previously prepared by Dr. Beech of Coldwater, Mich., and of those published by the Life Saving Society of New York. They have the sanction of other State Boards of Health and of City Boards of Health, and are fully indorsed by the State Board of Health of Rhode Island.

THE TREATMENT OF THE DROWNED.



**TWO THINGS TO BE DONE:—RESTORE BREATHING; RESTORE
ANIMAL HEAT.**

RULE 1.—*Remove all obstructions to breathing.* INSTANTLY loosen or cut apart all neck and waist bands; turn the patient on his face, with his head down hill; stand astride the hips with your face toward his head, and, locking your fingers together under his belly, raise the body as high as you can without lifting the forehead off the ground (Fig. 1), and give the body a smart jerk to remove mucus from the throat and water from the windpipe; hold the body suspended long enough to slowly count ONE, TWO, THREE, FOUR, FIVE,—repeating the jerk more gently two or three times.



RULE 2.—Place the patient face downward, and maintaining all the while your position astride the body, grasp the points of the shoulders by the clothing, or, if the body is naked, thrust your fingers into the armpits, clasping your thumbs over the points of the shoulders, and *raise the chest as high as you can* (Fig. 2) without lifting the head quite off the ground, and hold it long enough to *slowly* count ONE, TWO, THREE. Replace him on the ground, with his forehead on his flexed arm, the neck straightened out and the mouth and nose free. Place your elbows against your knees, and your hands upon the sides of his chest (Fig. 3) *over the lower ribs, and press downward and inward with increasing force* long enough to slowly count ONE, TWO. Then suddenly let go, grasp the shoulders as before and raise the chest (Fig. 2); then press upon the ribs, &c. (Fig. 3). These alternate movements should be repeated 10 to 15 times a minute for an hour at least, unless breathing is restored sooner. Use the same regularity as in natural breathing.



RULE 3.—After breathing has commenced, RESTORE THE ANIMAL HEAT. Wrap him in warm blankets, apply bottles of hot water, hot bricks, or anything to restore heat. *Warm the head nearly as fast as the body, lest convulsions come on.* Rubbing the body with warm cloths or the hand, and slapping the fleshy parts may assist to restore warmth and the breathing also. If the patient can SURELY swallow, give hot coffee, tea, milk, or a little hot sling. Give spirits sparingly, lest they produce depression. Place the patient in a warm bed, and give him plenty of fresh air; keep him quiet.

B E W A R E !

AVOID DELAY. A MOMENT may turn the scale for life or death. Dry ground, shelter, warmth, stimulants, etc., at this moment are nothing,—ARTIFICIAL BREATHING IS EVERYTHING,—is the ONE REMEDY,—all others are secondary.

BE PROMPT.

Do not stop to remove wet clothing before efforts are made to restore breathing. Precious time is wasted, and the patient may be fatally chilled by exposure of the naked body, even in summer. Give all your attention and effort to restore breathing by forcing air into, and out of, the lungs. If the breathing has just ceased, a smart slap on the face or a vigorous twist of the hair will sometimes start it again, and may be tried incidentally, as may, also, pressing the finger upon the root of the tongue.

Before natural breathing is fully restored, do not let the patient lie on his back unless some person holds the tongue forward. The tongue by falling back may close the windpipe and cause fatal choking.

If several persons are present, one may hold the head steady, keeping the neck nearly straight; others may remove wet clothing replacing at once clothing which is dry and warm; they may also chafe the limbs, and thus promote the circulation.

Prevent friends from crowding around the patient and excluding fresh air; also from trying to give stimulants before the patient can swallow. The first causes suffocation; the second fatal choking.

DO NOT GIVE UP TOO SOON: You are working for life. Any time within two hours you may be on the very threshold of success without there being any sign of it.

In suffocation by smoke or any poisonous gas, as also by hanging, proceed the same as for drowning, omitting effort to expel water, etc., from windpipe.

In suspended breathing from effects of chloroform, hydrate of chloride, etc., proceed by Rule 2, taking especial pains to keep the head very low, and preventing closure of the windpipe by the tongue falling back. Grasp the tongue between the forefinger and thumb, draw forward and hold.

PERSISTENCE IN EFFORTS TO RESCUSITATE THE DROWNED.

Dr. R. C. Kedzie, President of the Michigan State Board of Health, says, in relation to the foregoing circular, and in urgent persistence of efforts to resuscitate the drowned: "This bulletin has been widely distributed by this Board and it has been republished by many papers in our State. It has been adopted by other State Boards of Health and by city Boards of Health. It has thus secured a wide dissemination in our country. How much good has thereby been secured, it is impossible for me to state; but I have good reason to fear that *life is often sacrificed because energetic efforts at resuscitation are abandoned too soon*. I desire once more to urge upon the public *the duty of persistent efforts to resuscitate the drowned* and to repeat with emphasis one direction of the bulletin: 'Do NOT GIVE UP TOO SOON; *you are working for life. Any time within two hours you may be on the very threshold of success without there being any sign of it.*'"

"The efforts which are successful in restoring a human being to life certainly are not useless, and it is wicked to refuse or neglect to make such efforts unless the absolute certainty of death is established. It is not enough to say that the person *appears* to be dead. Persons who gave no signs of life for a long time after being taken out of the water have yet been brought to life by appropriate efforts. I most earnestly protest against treating the drowned as dead merely because they appear lifeless. I am fully persuaded that many such persons die because no adequate efforts are made for their recovery. Persons may swoon and for the time appear to be dead, but we do not assume that they are dead and leave them to their fate, but make energetic efforts to restore consciousness. No more should we assume the fact of death in the drowned, but should make like efforts to restore them to life."

HOW NOT TO DROWN.

"How to drown is an art that seems to be well understood and frequently practiced the world over. How not to drown is an art not so well understood, and requires some notice at the hands of this Board.

Drowning could be prevented if we could secure either of the following conditions: 1st, that everybody should know how to swim; 2d,

that nobody should ever go into the water. But as we cannot secure either of these conditions in the present order of things, we turn our attention to some means of reducing these accidents to their minimum of danger.

"Much good advice is often thrown away upon persons who find themselves suddenly thrown into the water: "keep cool;" "do not lose your presence of mind," etc. The conditions are very favorable to follow the first advice in a literal sense, for the water itself will assist one to get cool and to keep so indefinitely; but when a person is suddenly compelled to face death in an unexpected form, the advice to "preserve your presence of mind" is usually driven out of the mind by overwhelming terror, and the person too often becomes *absent minded* in an awfully literal sense of the word."

"The solids and liquids of the body are all heavier than water, but the living body on account of the air in lungs, stomach, and bowels, is slightly lighter than water; and so long as these cavities remain filled with air, the body will float in water, and a small part of the body can be kept above the water. While it is true that so long as the lungs, etc., are filled with air, the body is lighter than water, the difference in specific gravity is small, and only a small part of the body will float above water. What part will be above water depends upon the relative position of other parts of the body; if the legs are flexed and the arms thrown in front of the body, the centre of gravity is in the anterior portion of the body, and the top of the shoulders and back of the head only will be above water; the face being under the water, respiration will be impossible under such circumstances. But if the legs are straightened out and the arms thrown behind the body, the face will be brought above the water. In the attempt to float, therefore, *the legs should be straightened out, the head thrown back, and the arms held behind the body*; the face will then float above the water so long as this position is maintained. If one part of the body is thrown out of the water, a corresponding amount of the body will be submerged; if the arms are held out of the water, the head will go under. I remember the case of a boy who thought he would greatly increase his power to swim by tying an inflated bladder to each foot, but when he entered the water he came near drowning, because his feet were kept out of the water but his head under water; and he soon became practically convinced that it was important that his head rather than his heels should be in air."

"If the mouth and nose is kept above water, respiration may go on without interruption, and life may be sustained indefinitely under such

circumstances. This may be secured in still water by merely floating with the face upward, every other part of the body being kept constantly under water. But with very little exertion a person may do more than keep his nose above water, even if he is ignorant of the art of swimming. I have seen persons "tread water" by making the same movements with the legs as in walking up stairs, and thus keep the entire head out of water for a long time. If a person will add to this, certain corresponding movements of the hands—in fact, *make the same movements of both arms and legs that he would in climbing a vertical ladder*, but without lifting his arms out of the water and without closing his hands in the downward movement of the arm, he may keep his head out of the water even when the waves are running high, and may keep from drowning for hours. Whenever a person finds himself in the water and in danger of drowning, let him assume as speedily as possible a vertical position, and at once begin the same movements as in climbing a vertical ladder—*let him climb for life*—and he will be surprised to find with what slight exertion he can keep his head above water; let him be satisfied with this, for he may exhaust himself in vainly attempting more."

The following communication by Dr. MacCormac of Belfast, to the Sanitary Board July 13, 1877, on "PADDLING THE WATER AS A MEANS OF AVERTING DROWNING," is inserted as imparting valuable information on this important subject:

"Already the fine season has been ushered in by a number of deaths, some of them occurring in our very midst, from drowning. The means of safety, or relative safety, which I have to point out, are so very simple, and as I believe, so effective, that I am lost in wonder that no one has thought proper to insist upon them, as in the following remarks it is my intention to do. Swimming, as ordinarily practiced, is not the most sufficing means for escaping the dangers of the water. It needs some instruction to be able to swim, and practice to be able to swim well. No doubt it is desirable to swim and to swim well. But the great majority of persons of both sexes do not know how to swim at all. Yet unless people can swim, and swim well,—and even then they are not always successful, when the emergency comes, in preserving life,—swimming is, I am persuaded, not so effective a preservative as is conjoint paddling and treading water. As a rule, subject to few exceptions, persons precipitated into the water do not swim without previously learning. But paddling with the hands and treading with the feet require no prior instruction, and in the great

majority of cases would save life. In swimming, the mouth is on a level with the water in the intervals of the strokes; in paddling, the head is well elevated; the individual is able to look about; he can deliberate as to what is best to be done, and he is much less liable to take water into the larynx or glottis, a casualty which, I am persuaded, causes the destruction of many. Without prejudice to the art of swimming, I would have children exercise in household tanks from the tenderest age, in the act of paddling and treading water, so as to impart the confidence which unreasoning dread tends to lessen or take away when one is suddenly immersed, in an unusual medium. The animal, the quadruped, begins to paddle at once when cast into water, but as man does not habitually employ the anterior limbs as organs of locomotion, reason must tell him that he may, if he pleases, employ them as organs of locomotion in the water, just as readily as any four-footed animal. To be sure a man has not the habit of using his hands and arms for locomotion, as the brute has, but otherwise how much more available is the paddle-shaped hand than a hoof or a paw. Again, the man with little or no instruction, by throwing his head well back, can float and rest at pleasure, a thing of which the brute has no conception whatever."

"Of course, a little preliminary habitude is desirable, but without any preliminary habitude or instruction whatever, there is nothing to hinder man, woman, and child, were they unable, in common parlance, to swim a stroke, from beating water with the hands and feet, just as the lower animals do, and so keep themselves afloat for a protracted period, a period that in a multitude of instances would be found sufficient to invite rescue and preserve life. The action of the feet down will sustain the body. The action of the hands down will do so; *à fortiori*, the action of both will prove yet more effective. I have tried myself; one alone, or both together,—nay, with a single hand only,—in bygone years, I am sure, hundreds of times. There is no occasion for fuss or bustle. The body, taken as a whole, is actually lighter than water, bulk for bulk, and a very moderate amount of paddling with feet and hands, will be found perfectly adequate to sustain and guide its movements. In fact, so long as the individual paddles, as I here direct, he cannot sink. A horse, or dog, or cow, or cat, or swine, when immersed in water, begin instantly to paddle, and that without any prior instruction or exercise whatever. Now, a man, or woman, or child has only to do as the inferior animal does, and he, she, or it will float necessarily and inevitably. The place being otherwise safe and boats at hand, boats' and ships' crews, a regiment of

soldiers, schools and the like might jump into deep water and paddle themselves into security without risk or failure. In this, as in many other things, man is too often unaware of his own immense capacities."

"Animals not habituated to the water, will often take to it spontaneously, or, if cast into it, sustain themselves for indefinite periods. A horse, during disembarkation in Portugal, fell into the sea and paddled about the harbor for a matter of six hours before it was secured. Washed or thrown overboard, the lower animals have been known to float for a long time. I knew of a mule, which, having been washed overboard in the Bay of Biscay, paddled itself ashore, and then crossed the country a couple of hundred miles to its previous quarters. The staff-surgeon in charge told me that, after leaving the Peninsula, the horses of the troop had to be thrown overboard in order to lighten the ship in a gale. The poor things, when they found themselves abandoned, faced around, and, so long as the ship commanded a view, were seen to battle with the wrack and wash for miles. A man on the coast of Lincolnshire, mounted on a gray mare or other horse, used to swim seaward to vessels in distress, and thus rescued many lives. Recently, nigh Brooklyn, N. Y., a dog took the water and paddled, it is said, forty miles in search of his master. Dogs often gain the shore when ships and their crews have been lost. Some years ago a dog landed at the Cape of Good Hope, with a letter in his mouth. The vessel to which he belonged had gone down with all hands; but if the men had paddled as the dog paddled, all their lives might have been preserved. Indeed, I know for certain that formerly it was the practice at the Cape for men to paddle out, it was termed "treading water," and bear communications to and from vessels in the offing, where no boat could live. It was, and I believe is still, the case at Madras, similarly. Natives at the island of Ioanna, in the Mozambique Channel, treading water, come out, bearing fruit on their heads to the vessels, miles distant. The young people in the islands of the Pacific, breast the gigantic breakers out of mere sport. The Indians of the Upper Missouri traverse the impetuous current, invariably paddling and treading water."

"Short instructions for paddling and treading water, ought to be posted up in all schools, barracks, and bathing places; wherever, in short, people have to do with the sea or with masses of water. It should be shown how easy it is, with a little well-directed effort, to preserve life, and how the yearly and calamitous destruction which besets our shores might, now, and happily for all time to come, be effectively stayed."

One precaution is necessary for a person who is paddling and treading water, to avoid strangling; when cold water is suddenly dashed into the face, an automatic or involuntary inspiratory effort or "catching the breath" is caused, and if the face at the instant is covered with water, strangulation from drawing water into the lungs is the result. When waves are dashing in his face, the person must guard himself against this spasmodic inspiration by holding his breath at such times, or he may even grasp his nose and close his mouth with one hand and thus prevent the possibility of strangulation.

HYGIENE IN THE PUBLIC SCHOOLS.

BY

GEORGE W. JENCKES, M. D.,

OF WOONSOCKET,

MEMBER OF THE

STATE BOARD OF HEALTH.

The following paper is a part of an Address by Dr. G. W. Jenckes
at the dedication of the Woonsocket High School.

HYGIENE IN THE PUBLIC SCHOOLS.

We ought to realize that true education does not consist merely in the acquisition of knowledge, the crowding of the memory with facts, but in developing all the powers of body and mind equally and harmoniously, and strengthening them by vigorous exercise. In pleading for the best education possible for us to obtain through the means at our command, and in protesting that the sharpening of the mental perceptions is but a small part of such education, what I shall say may possibly "smack somewhat of the shop."

It is not beyond the province of one who has given some attention to the study of individual and public health, to question somewhat the routine of school life and education. It is too much the fashion to lay great stress upon the mere intellectual processes involved in the pursuit of a well arranged course of study, which, as a means of mental discipline, may be all well enough, but which fails to be of practical benefit in the after affairs of life in a large proportion of scholars. We establish a curriculum of studies that shall fit for some special vocation in life; we teach something of the customs of communities and the regulations that prevail in business, but we do far too little toward imparting a true knowledge of physical existence. Physical education should go hand in hand with mental education. Health is a part of the higher culture, for body and mind are practically inseparable, and we should know nothing of the workings of the sound mind, were not the bodily senses in healthy condition to provide for the mental needs.

Health stands behind the accomplishment of all great success. It was not an army of invalids that marched with Sherman to the Sea, and broke the back of the rebellion with the force of a mighty blow.

The vigor and hardihood of able bodied soldiers and the supreme energy of an educated will in the commander, were equal, if not superior, agents to the musket and cannon in securing that triumph.

And so it is in every sphere of life. The application of practical force alone can make actual accomplishments of what would otherwise remain the dreams or hopes of a weaker will. Our education tends too much to create wants and expectations beyond our power to realize. Let me quote one who has spoken thoughtfully upon this subject: "Our young men know how to spend more money than they can earn, and our young women too often feed their ambition upon romantic fancies, and fill their stomachs with enfeebling trash! They dream of fortunes and palaces, and do not know how to make a shirt or a loaf of bread, to nurse an invalid or tend a baby, to train a child or rule a household; and sometimes even they crave the jewels and orange blossoms of the bride, while they repudiate the duties of the wife and the destinies of the mother. And the race is in danger of dying out in some quarters because of this repudiation of the queenly dignity and fidelity of the sex." What we need, then, is a careful and systematic education of all the powers of the body and mind, so that while the mental perceptions are sharpened, and the moral attributes cultivated, the physical system shall be placed and kept in such relations to external influences as shall establish the best possible degree of health. There is much wisdom in the old nursery rhyme,

"Early to bed and early to rise,
Makes a man healthy, wealthy and wise,"

in that it gives health the precedence, leaving wealth and wisdom to follow if they may. The saying that "wisdom and virtue cease where dyspepsia begins," is but an extravagant expression of the same truth. The primary fact to be recognized is, that all our education comes through the senses, and the more healthily and wisely they are open to the truths and forces of the universe, the more active and the stronger will be the mental operations resulting. Health begets force, and force applied to knowledge, makes it a power. It is said that "Caesar was a better speaker and writer because he had been a soldier, and could put into his pen, in his commentaries, the point and fire he had won by his sword in his campaigns; and that David was a greater poet because the hand that touched the lyre, had grappled with the lion and the bear, and had hit the Philistine upon the head with a sling, as unerring as the words that have reached the heart of the race, and will reach it evermore." Our very constitution as organic bodies,

determines our duty; all the health and strength of which we are capable are demanded by our possible attainments. Not only to establish this state of health, but to preserve it, is the part of Hygienic study.

Between a state of perfect health and actual disease, when professional aid is sought, there is a wide field, occupied by thousands who generate just enough of vital energy to enable them to maintain a sort of passable existence, but not enough to enable them to mingle in the harder conflicts of life. To remedy this state of things, more of our thought and effort as public educators ought to be directed. According to the reports of many of our Educational Boards, it is the nervous system especially which suffers from our present methods of education. To say nothing of special diseases, such as myopia, chorea, &c., which are on the increase among school children, we have all of us seen something of the pernicious effects of this intellectual high pressure in some of the recent sad instances of cerebral disturbance in public life. Without doubt, a proper amount and well regulated course of study are among the best means of strengthening both mental and bodily powers; and equally, without doubt, much of our present method of education by the amount and kind of work done, by illy selected hours of study, by improperly divided seasons of school work, where a short vacation follows each of two or three terms, and then a long vacation of two or three months of aimless idleness of body and mind, and by other means, such as illy lighted, illy heated and illy ventilated school-rooms, bad seats and bad type in text-books, by useless drills and cramming for special examinations, by rank lists, and by so much routine teaching from text-books rather than the cultivation of the original powers of observation in the pupil, result in an indescribable sense of fatigue at the end of the day's work, and prove the severest possible strain upon the child's natural powers. I speak of these things, Mr. Superintendent and friends, because I wish to urge that the study of Hygiene, practically the most useful science, should be made a marked feature in every grade of education. While the rudimentary truths should be inculcated in every household, the grand principles of the science should be thoroughly taught in every school, from the highest, where the teachers are fitted for their labors, to the lowest, where, either through errors of judgment or an almost unparadonable degree of ignorance, the first steps are taken in devitalizing so much child-force. For instance, how much time have we all seen devoted by teachers in trying to prevent certain motions and changes of position, that had become actual physiological necessities by reason of too long restraint.

Other misconceptions which I cannot particularize, as to the needs, habits and peculiarities of scholars, extend through the whole course. I can only say that if there were a better knowledge of Hygiene, there would be less negligence in the supervision of those conditions necessary to a continuance of intellectual as well as moral virtue in school children, and less ignorance on the part of parents and teachers of the existence of that nameless vice which saps the very foundations of nervous energy.

Properly taught, the study of Hygiene, involving as it does elementary instruction in chemistry and physics, as well as physiology, affords as good means of mental discipline as any other course of academic study, since its principles are the purely logical deductions of demonstrable facts. And beside the discipline thus afforded, the study of this science would have the further advantage of offering practical benefits to every member of the community. The amount and frequency of habitual crime are largely traceable to physical debasement. A knowledge, then, of the philosophy of health and life, would constitute one of the best legacies to posterity by informing those who are to give birth to future generations how best to fulfill their parental obligations, and to transmit to their offspring an unimpaired inheritance of health.

Mr. Superintendent, in committing to your special care the interests of education that shall centre in this building, I would express the hope that the instruction to be here imparted, shall result in giving to this community and State, able-bodied and able-minded citizens. Success in life, whether with the student, the artisan or laborer, can be achieved only by hard work, and hard work pre-supposes vigor of body, power of endurance and an educated will. These are the foundation stones; "other foundation can no man lay than that is laid."

WALL PAPERS,

THE DANGER TO HEALTH ARISING THEREFROM, AND
HOW PREVENTED.

POISONOUS CARDS, LABELS, ETC.

BY

ELISHA DYER, JR., PH. D.,

OF NORTH KINGSTOWN,

MEMBER OF

STATE BOARD OF HEALTH,

CHAIRMAN OF COMMITTEE ON EXPLOSIONS AND CHEMICALS DAN-
GEROUS TO LIFE AND HEALTH.

WALL PAPERS,

THE DANGER TO HEALTH ARISING THEREFROM, AND HOW PREVENTED.

POISONOUS CARDS, LABELS, ETC.

Some few years since the discovery was made that arsenic existed to a considerable extent in various wall papers offered for sale throughout the country, and many diseases whose origin had seemed mysterious were readily accounted for when the presence of this active poison became known.

For a while the public were cautious in buying, and green papers were a drug in the market.

The subject, however, soon lost its hold upon public attention, and finally disappeared out of sight and out of mind.

Arsenic, however, was still employed in the manufacture of wall papers, entering more or less into those of other colors and tints than the well-known green. Indeed, it is still an open question whether this well-known green, the very color of which admitted its baseness, was not less hurtful than is the modern fashionable wall papers in whose delicate tint and subdued tone may lurk this deadly poison all the more dangerous to life and health, because unsuspected or undiscovered.

All wall papers are not dangerous from this source, and there are undoubtedly green papers in whose pigment no poison is combined, but if one "must" purchase green wall paper let him first cause them to be tested for arsenic before exposing his household to possible sickness and death.

Although arsenic is the most dangerous element to be looked for in wall papers, it is by no means the only source of probable injury to health.

Every one is fully aware how easily the colors are rubbed off from the surface of many papers; how oftentimes the heaviest, thickest papers wear the shortest time, and how frequently the ordinary dusting of the room detaches the coloring material from the walls.

If this coloring matter thus detached was promptly removed from the room no injury would result save that to the appearance of the walls from constant loss, or apparent fading of the colors of the paper. But this coloring matter remains frequently as an impalpable dust in the room, to be breathed by those in the apartment, settling upon the furniture, hangings and carpet, and disturbed and put in motion, but *not* removed, whenever the room is dusted or swept.

Another source of possible injury to health exists in the decomposition of the sizing and paste used in, and upon, the paper hangings themselves. If arsenic should be present in the paper, it is a grave question whether this decomposition is not rendered exceedingly dangerous to health by the chemical combination thus formed, by the decomposition of the starch and gums with the arsenic, or even with other substances entering into the coloring matter upon the paper.

It is certainly worthy of passing consideration that in all papered rooms, a constant decomposition of the starch and gums is taking place, and persons occupying such rooms are living in an atmosphere more or less contaminated by the decomposition continually going on.

In proportion as houses are kept closed and darkened, does the danger from this cause increase, and the musty odor of a papered room which has been closed and kept darkened for some time, is sufficient evidence of the danger to be apprehended.

Three sources of danger to health, therefore, may be looked for in wall papers.

- I. From those known to contain arsenic.
- II. From those whose coloring matter is easily detached.
- III. From the decomposition of the size and paste employed in the manufacture of the paper, and hanging the same upon the walls.

The danger from these sources may be averted,—

- I. By submitting all doubtful or suspected papers to the tests for arsenic, before putting the same upon the walls.

II. By selecting such papers as are known to contain no arsenic, and where colors are not easily removed either by rubbing with a dry cloth or the hand itself.

III. By removing all the old paper, and thoroughly washing off with hot water, all the paste from the walls before repapering.

The simplest test for arsenic, and one most available for the public is given by R. C. Kedzie, M. D., Chairman of Poisons, &c., Michigan State Board of Health, 1873, and is as follows:

"If the color is a bright grass green it may be safely rejected at once. If a little ammonia poured upon the paper discharges the green color, or produces such a change in the color as indicates the removal of green it should be rejected.

"The two arsenical greens, Scheeles Green and Schweinpath Green, are readily soluble in ammonia water—the water acquiring a bluish tint. Other compounds of copper are also soluble in ammonia water, but they are not much used in paper hangings. If you wish to identify the arsenic, drench a piece of the paper in a little ammonia water, pour off the clear water and drop into this a crystal of nitrate of silver, if a yellow precipitate forms around the crystal it indicates arsenic."

POISONOUS CARDS, LABELS, TAGS, ETC.

There exists at the present time another prolific source of danger from arsenic, particularly to young children. And that source is found in the "green" business or advertising cards, distributed indiscriminately upon the streets; in the green tickets used for entertainments, theatre checks, &c., and in labels, tags and shop cards. In fact the danger of poisoning from these cannot be estimated.

Every child should be prohibited from having any "green" card or ticket in its possession, and it should be the duty of every parent to impress upon his or her child or children, the dangers likely to arise from handling such cards, &c., especially when, as is often the case, the child's hand is moist, and the poison is thereby easily detached from the surface of the pasteboard and communicated to the person handling it. An advertising card was recently shown the writer, probably one of thousands printed, and given away daily upon the streets, whose very color proclaimed its dangerous character, and the children of the family were forbidden ever to keep such a card, or ever to receive it from any one upon the street.

The estimable report of Dr. Draper, "On the evil effects of the use of arsenic in certain green colors," in the third annual report of the Massachusetts State Board of Health, and the article on "Poisonous Paper," by Dr. Kedzie, Michigan State Board of Health, for 1873, will well repay a careful reading by every one interested in the promotion of the public health.

It is impossible, in the short space of an article like the preceding one, to impress upon the general public the importance of the subject matter contained therein.

It is, however, to be hoped that such attention may be given to it, that the evils arising from ignorance of the matter may not be realized in this State, as they have been in numerous instances, not only in this country but in the countries of the Old World.

THE PREVENTION OF
KEROSENE ACCIDENTS.

BY

JOHN H. APPLETON

OF PROVIDENCE,

PROFESSOR OF CHEMISTRY IN BROWN UNIVERSITY.

THE PREVENTION OF KEROSENE ACCIDENTS.

Every one knows that kerosene accidents are constantly occurring. Yet I should think that the oil had been used long enough and widely enough for people to have learned how to use it with safety.

I do not think it worth while to explain here the scientific conditions which precede kerosene accidents; I do not think it desirable to discuss here the question whether such accidents are generally due to a mere *blazing up of a quantity of oil, carelessly spilled and set on fire*, or whether they are often caused (as is commonly believed) by *explosions of lamps*. A discussion of these or of other similar questions would probably prove of little service to those who are most likely to become the suffering and dying victims of bad or of misused oil.

I prefer that my remarks shall take the form of an easily understood warning; for I believe that such a warning is most likely to conduce to the protection of consumers of oil.

Now there are three principal conditions attending the use of kerosene oil: these conditions are *first*, the purposes for which the oil is used, *second*, the kind or quality of oil used, *third*, the character of the people using the oil.

FIRST CONDITION.—Kerosene oil is used in two well-known ways, namely: *for a wrong use*, as for kindling fires; *for a right use*, in lamps for lighting.

SECOND CONDITION.—Kerosene oil as offered for sale, is of two kinds, namely: *unsafe* oil, and *safe* oil.

THIRD CONDITION.—Kerosene oil is used by two classes of persons, namely: the careless and ignorant, and the careful and intelligent.

The mere statement of these conditions at once suggests three rules.

FIRST RULE.

No person ought to use any kind of kerosene oil, good or bad, for kindling fires. When so used, the oil is liable to instantly burst into an enormous blaze which, streaming out of the stove, at once envelops any one near it in a sheet of flame that may cost the user his life.

SECOND RULE.

No person ought to use unsafe oil. Every careful person will at once admit the force of this proposition. The question naturally arises, "how may we avoid unsafe oil?" I believe that the simplest answer is, "buy only from the most respectable dealers, and take from them only the oil of well-known respectable manufacturers."

It is true that our statutes make provisions looking toward the *complete exclusion of unsafe oils from the State*. But statutes may fail to produce their intended effects. Inspectors may not do their duty. Bad oil may be offered for sale. But there are several large firms engaged in making oil that is uniformly of high test, and safe.

Any honest and respectable dealer can at once mention the names of manufacturers whose oils are unquestionably safe.

THIRD RULE.

Ignorant and careless persons ought not to be allowed to use kerosene oil at all. They should be required by their employers to use candles, or other extremely safe light.

These rules have so narrowed the subject that we may readily conclude that no anxiety need be felt when

(*first,*) intelligent and careful persons,

(*secondly,*) use safe oil,

(*thirdly,*) in suitable lamps for illumination.

But the statement does not appear to be complete until we enumerate some of the marks which distinguish—in this matter—careful persons from careless ones.

CARELESS PEOPLE.

Careless people neglect all day-work on the lamp; they leave it to be done at the worst time, that is, after night-fall.

If the careless person's lamp gets out of order or low in oil, he is tempted to keep it lighted while refilling—so he is liable to be burned to death in the operation.

CAREFUL PEOPLE.

Careful people have more than one lamp; they buy oil in the day-time; they clean the lamps by day-light, filling them and trimming the wicks.

If one of the careful person's lamps gets out of order, *he uses the other*, and so he can fill, or otherwise adjust the other on the next day during the safer hours of day-light.

I leave these plain remarks to the common sense of the reader, feeling certain that, after all, it is common sense that must be the guide in this matter as in most of the business of life.

KEROSENE.

BY

H. H. BURRINGTON,

OF PROVIDENCE,

CHEMIST AND DRUGGIST.

KEROSENE.

In compliance with the request of Hon. Elisha Dyer, Jr., Committee of the State Board of Health on *Explosives, &c.*, I respectfully present the following statement of facts in relation to kerosene; and the request comes in good time, as there are matters of importance in connection with the kerosene oil business in this city that need prompt and decisive action:

To make the matter as intelligible as the nature of the case will admit, I have thought it best to commence at the beginning.

As petroleum and its products have become of the greatest utility to the people of this, as well as of other countries, and as the whole business of its distillation, manufacture, &c., has become so systematized and perfected that there is no reason and no excuse why any kerosene oil, intended for illuminating purposes, should be allowed to be placed in the market, or permitted to be sold, that is not safe, or that will not stand a legal fire test, duly inspected, and the package in which it is contained suitably branded by a competent person appointed for that purpose. In the early days of its discovery, many accidents occurred from a want of knowledge of its properties, which might have been excusable, at that time, but are not so now.

The matter of unsafe kerosene oil, sold in this city for illuminating purposes, was first brought to the notice of the City Council, in April, 1866, and was published in the *Daily Journal*, at the time, as follows:

A STARTLING FACT

was brought to the attention of the Common Council, at its last meeting, by Mr. H. H. Burrington, who introduced the draft of an

ordinance, relative to inflammable and explosive articles, and took occasion to comment upon the dangerous character of much of the kerosene now sold in our city, for illuminating purposes. Mr. Burrington has tested twenty-one samples, and finds much of it as unsafe as gunpowder. Only five of the samples were safe to use as a burning fluid, and they were not entirely free from objection.

In introducing his ordinance, Mr. Burrington remarked: The great consumption of kerosene oil in cities where gas, so called, is used, as well as in villages where gas is not used, loudly calls for a few remarks upon its properties, the benefits, and disadvantages, the safety, and danger attending its use.

In the manufacture of kerosene, the first running of the oil is called benzine, kerosoline, &c., &c. Now benzine has a peculiar property, in which we all are deeply interested: it is that of explosion, and it is the presence of this fluid in kerosene proper which renders the oil explosive. Exclude from the kerosene this explosive part of the fluid—this benzine—and we have an oil as harmless as that of the spermaceti whale, with a far greater illuminating power.

But it unfortunately happens that this explosive product—the benzine—is in large proportion to the whole distillation, and in consequence, a part of it is suffered to remain in, or is intentionally mixed with the kerosene. As is the proportion of benzine to the kerosene, so is the power and danger of the explosion. That some of the kerosene in the market is carefully and properly prepared, and therefore perfectly safe in its use, is abundantly and satisfactorily proved; while it is a fact lamentably ascertained by almost daily experience, that much of the kerosene sold among us, contains too large a proportion of the explosive material. Now, the first question that naturally arises is: how are we to know what oil is safe to burn, and what is not.

It is well known that heat increases the explosive powers of kerosene, by converting the benzine, or a portion of it, into vapor, which instantly ignites on coming in contact with a flame; hence the explosion of a kerosene lamp when it is extinguished by blowing down the glass chimney upon the flame. If too much benzine be present, a little heat is enough to raise sufficient vapor to be dangerous.

By decisive experiments, it is known that kerosene that will bear heat of 120° F. is safe. No danger attends it, if used in a properly constructed lamp, and the heat to which kerosene is exposed, in all ordinary occasions does not equal the temperature named. Kerosene that will not stand the test of 100° F. should be looked upon as so much gunpowder.

In consideration of the above facts, I have been induced to test the quality of twenty-one samples of kerosene now in market, with a kerosene oil fire tester, and with the following result:

One sample exploded at 78° F.; one at 84° F.; one at 86°; three at 88°; two at 90°; two at 92°; one at 94°; two at 98°; one at 100°; one at 102°; one at 104°; one at 106°; one at 108°; two at 110°, and one at 114° F. Thus it will be seen that eight only out of the twenty-one samples stood the test of 100° F., and only five out of the twenty-one are sufficiently free from explosive matters to be safe, and that ought to be allowed under any circumstances whatever, to be kept in market.

In conclusion, let me assure you, that one barrel of the explosive compound is positively more dangerous to property and life than one hundred barrels of the preparation that will stand the test of 110° Fahrenheit.

The result of the above report was the adoption of an ordinance by the City Council, providing that no kerosene oil should be sold in the city that would not stand the fire test of 110° F., created the office of Inspector of Kerosene, and defined his duties, and also provided how petroleum oil, or any of its products, should be stored.

The ordinance gave general satisfaction, and the result was a decrease in the number of accidents occurring from the use of poor kerosene, and so continued for several years.

In May, 1877, the following statement appeared in the *Daily Journal*:

“The alarm of fire, Saturday night was caused by the explosion of a kerosene lamp. We had written mysterious explosion, but we can hardly say that any kerosene explosions in our city are mysterious, in view of the facts set forth in Prof. Appleton’s report on ten samples of kerosene taken from branded casks and submitted to his chemical inspection.

“A feeling of insecurity must pervade the whole community, for the peril is not confined to those who use explosive fluid, unless a rigid enforcement of the law regulating the inspection of kerosene can restore confidence in the city tests and brands.”

The following are the tests of the ten samples referred to:

<i>Marks.</i>	<i>Burning Point.</i>	<i>Marks on Barrels.</i>
No. 1.....	100°.....	120°
“ 2.....	90°.....	122°
“ 3.....	106°.....	122°
“ 4.....	94°.....	120°
“ 5.....	100°.....	None.
“ 6.....	104°.....	120°
“ 7.....	88°.....	120°
“ 8.....	104°.....	125°
“ 9.....	104°.....	122°
“ 10.....	108°.....	123°

It will be observed by the above report, that the oil tested, is nearly as low test as that tested twelve years ago, when there was no Inspection of Kerosene.

At a recent meeting of the “Providence Franklin Society,” I read a paper upon “The Explosiveness of Kerosene Oils.” As portions of it are applicable in this connection, I reproduce it here.

In the early days of the discovery of kerosene oil, it was distilled from bituminous coal, and so much pains was taken in its manufacture, that it was but seldom that any accident occurred from its use. It was only after the discovery of the immense quantities of petroleum oil in Pennsylvania that its cheapening was practised.

And during the past few years, the competition in price has become so great, that its usefulness has almost been exceeded by its dangerous qualities. The dealer not being satisfied with it as it comes from the manufacturer, let it be ever so poor, still further reduces its quality, by adding naphtha to such an extent, that it is unsafe and unfit to use for illuminating purposes. It is true that this mixed oil will not always explode, and can be burned in lamps in comparative safety, under certain conditions. When the lamp is full, no vapor can be evolved, and if a match were thrust into the oil, it would be immediately extinguished. Not so, however, if the lamp is put in a warm place and is only half full of oil. Then, as the oil is consumed, its place is filled with an invisible vapor, which will instantly explode when it comes in contact with the flame; or if there should be any defect in the top of the lamp, the vapor would escape, and there would be an explosion, or the vapor might be forced in contact with the flame in the act of blowing down the chimney, a practice that is extremely hazardous, and should never be done, especially when oils of a low grade are used.

Almost all of the northern states have passed laws forbidding the sale of kerosene that will explode at a lower temperature than 110° F. Experience, however, has shown that the explosive point should have been placed at 125° F., instead. Iowa has recently passed a law, compelling 150° F. as the fire test, and all dealers who sell oil of a lower test, are liable to both fine and imprisonment.

It will usually be found that when kerosene lamp explosions take place, as they often do at this season of the year, the lamp was in a very warm place, and the oil used of a lower test than 110° F. About a year ago I procured some half-dozen samples of kerosene oil from the stores where it was for sale, and found that none of them stood a higher test than 100° F.

This season I have done the same thing, and find the kerosene offered for sale, 10° F. poorer than that sold last year, none of the samples standing a higher fire test than 90° F.

The facts to be deduced from the reports and statements above mentioned are, that there are thousands of barrels of kerosene sold in this State every year, from 10° to 25° below the lawful fire test, to the great danger of loss of life and property.

Kerosene oil is a mixture of several elements, which under certain conditions, is of a highly dangerous character, and its natural qualities and phases can best be understood by those who are fully conversant with its chemical properties; and so much depends upon the reliability of its fire tests, that the office of inspector of kerosene should be filled by a practical chemist, or by those who are fully competent to perform its duties.

The State laws, in relation to the inspection and sale of kerosene, need revision in some particulars, which it is hoped will be done at the next meeting of the General Assembly.

Very respectfully yours,

H. H. BURRINGTON.

Chemist and Druggist.

PROVIDENCE, Jan. 1, 1879.

MEDICAL TOPOGRAPHY

OF RHODE ISLAND.

BY

CHARLES W. PARSONS, M. D.,

PROFESSOR OF PHYSIOLOGY IN BROWN UNIVERSITY.



northeast. Thirdly, the islands form a very important division of the State. The island which gives name to the State fills up a large part of the width of Narragansett Bay in its lower half. There are other inhabited islands in the Bay; and Block Island, more than ten miles off shore, in the Atlantic Ocean, is a well-peopled town.

The early settlements of the State were mostly on the islands and shores of the Bay, and at its head. All the important villages which grew up before cotton manufactures were introduced were near the water. We may defer, for the present, an account of Providence, which is at the head of the Bay. The other places have depended partly on commerce and fisheries for their support, and have not grown as rapidly as the rest of the State, with one or two exceptions. Their climate is tempered by the Bay open to the south, and by the Gulf Stream, and is more equable than that of more northerly parts of New England. Newport, the largest of these towns on the Bay, was an important seat of commerce before the Revolutionary War, and is now a summer resort of unsurpassed attractions; it is famous for its "delicious and cosmetic climate," modified by the direct breezes from the Atlantic Ocean. The part of Newport occupied by villas and hotels enjoys these advantages of air and situation to the full; but most of the residents of this old town live on the side toward the harbor, where the houses are quite crowded, and the air is more confined. The population of Newport is more than 10,000. The city has not been free from severe visitations of epidemic disease, scarlatina having been very fatal there in the winter of 1857-1858, and typhoid dysentery in the summer and autumn of 1863.

The western portion of the State is occupied by the granitic rocks, mostly gneiss, forming hills of moderate elevation, of which the general direction is from north to south. The whole tract of country from Western Connecticut to Narragansett Bay has this general character. In the western part of Rhode Island, the larger streams are altered in their course by draining eastwardly toward Narragansett Bay; except in the southern towns, where they run toward the southwest, parallel to the general trend of the coast, and empty into the Atlantic Ocean. Still, the small beginnings of these streams often show the influence of the prevailing north and south course of the hills. The gneiss of Western Rhode Island is continuous with that of Central Massachusetts. That portion of the State is generally blessed with plenty of good pure water.

This granite tract is not generally densely inhabited, the most populous parts being the manufacturing villages which line the streams

that furnish water-power. Some of these are not as favorably situated for health as the higher land between them. The houses of the operatives, which are in most villages owned by the proprietors of the factories, are too often built near the level of the streams, subject to the damp and mists of the low valley, the wells being fed more or less from the river-water, which contains organic matter from vegetable and other decomposition. In the hot and sickly season, these valleys are apt to be either sultry at night, or else the temperature falls very much and rapidly. We shall have occasion to give some details on this point, in speaking of dysentery, which appears every August and September in the lower lands of this western region of the State.

As we approach Narragansett Bay, a new geological character modifies the scenery and soil. A basin occupied by the coal-bearing rocks dips under the Bay, reaching a part of each side. The western boundary of this basin passes from near the northeast corner of the State, and runs in an irregular curve a few miles west from the shore of the Bay, till it meets that shore some twelve miles from the ocean. South of this point, the granitic rocks extend quite to the Bay, and indeed, encroach on the southwestern part of its largest islands. Near this western boundary of the basin are many marks of geological disturbance, dislocated strata, metamorphic rocks, and beds of iron and lime. On the east side, the granite reappears in the towns south and east of Mount Hope Bay, and at Mount Hope. This basin, as it enters the State from the northeast, is over fifteen miles wide, and narrows toward the south. The dip of the rocks in all the western part of the basin is toward the east, sometimes southeast, sometimes northeast, and sometimes with great variations in small space. East of Pawtucket river and of the most northerly part of the Bay, the strata still dip eastwardly, draining the soil, not toward the Bay, but toward ponds and small fresh-water rivers. North of Mount Hope, toward the town of Warren, the dip is northerly; in the towns south of Mount Hope Bay, and along the eastern shore of the island of Rhode Island, there is a westerly dip, being the side or wall of the basin. The main rocks of this formation are coarse and fine conglomerates, slates and shales, often containing vegetable impressions.

Some points in the topography of towns lying on the east side of the Bay and Pawtucket river, within the limits of this basin, ought not to be omitted here.

The town of Warren has a small area, and most of its inhabitants live in the village, which is situated on a rather low and level tract, having Warren river, half a mile wide, on the north of it, and a cove

emptying into that river, on the northeast of the village. The soil is underlaid by hard clay. The strata in the hill south of it dip toward this low land. At very high water, the marshes adjoining the village are liable to be overflowed. There is no barrier to shelter this village from the northeast winds coming over this broad expanse of water. The compact part of Bristol is south of the hill which divides the township from Warren; it is sheltered on the north and east, and open to the Bay toward the south. It has been shown by bills of mortality kept for several years, that deaths attributed to consumption are considerably more frequent in proportion to the population in Warren than in Bristol; while Bristol has suffered more from zymotic diseases, such as scarlatina and summer complaints. In a series of years the deaths from consumption were in Warren about twenty-three per cent. of all; in Bristol; about thirteen per cent. In the former place, about one in every 275 inhabitants died annually from consumption; in the latter, about one in 450. These results were published some years ago in the Second Registration Report of the State and in Reports since, very similar statistics are given. It is true that the vagueness in the use of terms throws a shadow of doubt over any such results; but in each town the causes of death were usually ascertained from physicians; in Warren the bills of mortality were kept by an eminent physician of that town; and we know no reason to suppose that any difference in the nomenclature of disease prevailed in the two places.

We have also some interesting testimony from Pawtucket, which we received in a letter from Dr. Sylvanus Clapp, a distinguished physician of that place. The village of Pawtucket lies on both sides of Pawtucket river, at the head of its navigable portion.

Dr. Clapp writes: "After a few years' observation, I became satisfied that consumption was much more prevalent on the east side of the river than on the west. Subsequent observation has clearly demonstrated the fact; there being a fraction over two deaths on the east to one on the west, in proportion to the population. This I gather from the records of the town, as well as my own.

"The Pawtucket or Blackstone river runs a little west of south; the land rising on each side of the river about eighty feet above the level of the water. The tides come up to the falls. The land rises more abruptly on the east than on the west side. As to geological formation, the conglomerate or grauwacke, alternating with clay-slate, occurs abundantly in regular strata, which run north and south, and dip about 80° to the eastward. The dip of the rock is the same on both sides. All the springs on the west side run directly into the river,

while on the east side they run in a southerly direction to the river. The soil on the east side contains more clay, and springs are much more abundant. Then there is a large pond, situated at the edge of Seekonk Plain, and not more than half a mile from the river, directly east of the village; this, when full, must cover 25 or 30 acres. It is situated higher above tide-water than the greater portion of the village. The wells, for the most part, are but a few feet below the ground, the water coming near the surface in the spring of the year. Some of the cellars in the lower streets contain more or less water every spring.

These observations agree quite well with the general results of inquiries made by Dr. Henry I. Bowditch, of Boston, and presented in the discourse delivered by him before the Massachusetts Medical Society, in the year 1862. The following extracts show the drift of his views: "I believe that all towns, parts of towns, houses even, that *rest on* damp, cold soils, are by that very fact peculiarly liable to the prevalence of consumption. I believe that similar locations *near* wet meadows, rivers, marshes, &c., though less subject to the law, are nevertheless in a lesser degree, promoters of consumption in the families resident thereupon."¹ He also shows a similar influence of north and east winds blowing over water.

In the western part of Providence city, and in a tract extending about ten miles south, and six miles north from it, the carboniferous rocks are overlaid by deposits of gravel and sand, with some layers of clay, forming a pretty level and not over-fertile region.

Over all these formations the "drift" common in all parts of New England is found, with its usual character of gravel and boulders.

There are no large alluvial tracts; and no very high hills, nor large rivers in Rhode Island. We doubt if any point in the State reaches a height of six hundred feet above the level of the sea. Still, the rivers have a considerable fall; in many parts they are narrow and rapid, affording excellent motive power. This fact has had a most important influence on the growth of population, the industry and social and sanitary condition of the State.

The soil is not fertile, compared with large regions which have now been brought into easy communication and competition with us. Still, it is probably more capable of yielding a profit to skilful husbandry, on an average, than the soil of Massachusetts. The northern towns were long ago celebrated for their orchards; the southern towns of the main land export great quantities of poultry; and the large islands con-

¹ Communications of Massachusetts Medical Society, vol. x. p. 122.

tain most beautiful tracts of farming land. But the agricultural industry of the State is far less important, in proportion to its population and wealth, than it was many years ago.

The city of Providence contains nearly forty per cent. of the entire population of the State. It is situated at the head of Narragansett Bay, Pawtucket river forming its eastern boundary. It was originally laid out between that river and Providence river, a mile or two farther west. But the city has grown toward the west, till now more than three-quarters of the population live west of Providence river. This river, with a broad cove, through which the tide ebbs and flows, divides the city into an eastern and western portion. The former lies mostly beneath and upon a ridge which rises by a steep ascent to a height of nearly 200 feet. It rests on stratified conglomerate (grauwacke), overlaid with gravel; the well water is generally abundant, cold, and clear; the uneven surface gives excellent opportunities for drainage. Some streets on this side of the river are low and shut in by higher land on all sides, and mostly inhabited by families not in the best sanitary conditions. On the west side, most of the residences are built on the plateau of gravel and sand already described; this was formally continued toward the river by sandy hills and low, wet land, which has now been reduced to a regular and convenient slope. There was formerly difficulty in obtaining good water here; but very good water is now abundantly supplied to this, and all other parts of the city, from the Pawtuxet, a river about six miles distant. A good deal of made land on this side is now covered with busy streets.

The higher parts of the city are generally occupied by the wealthier and more comfortably situated classes; the poor and laboring class, including a large part of the foreign-born live more on the outskirts and the lower land.

The City Registrar, in his annual report for 1859, mentions the following favorable circumstances in the topography of Providence:

"1. The very great inequalities of the soil within the limits of the city, giving easy and efficient drainage; the speedy removal of surface filth, and a free circulation of air. 2. The comparatively scattered location of the dwellings. 3. The numerous trees and gardens in most portions of the city. 4. The almost total absence of cellar tenements and underground population. 5. The absence of *large* tenement-houses, such as are found in other cities. 6. The absence of narrow courts and closed lanes. 7. The open space of tide-water through the centre of the city."

The most complete, long-continued, and available meteorological records kept in the State are those of Professor Alexis Caswell, D. D., the observations being taken three times a day, with very slight interruptions for forty-five years, on College Hill, Providence.

Rev. Dr. Caswell having deceased January 8, 1877, no reliable records of meteorological changes for the years 1877-'78 are available.

The following tables were compiled by Dr. E. M. Snow, for the Registration Report for 1876, from observations made during that year, by Dr. Caswell:

TABLE I.

Showing the mean altitude and range of the Barometer, the prevailing winds, the mean relative humidity, the mean cloudiness of the sky, the number of days of rain or snow, and the quantity of rain and melted snow, for each month of the year 1876, and compared with the average for 45 years.

MONTHS.	Mean height of the Barometer reduced to 32° Fahrenheit, and to the Sea Level.	Range of Barometer.	NUMBER OF DAYS OF PREVAILING WIND.				Relative Humidity.	Mean Cloudiness of the Sky.	Number of Days of Rain and Snow.	RAIN FALL.		
			North and East.	East and South.	South and West.	West and North.				Rain and Melted Snow in Inches.	Monthly.	From January First.
January.....	30.068	1.924	3	5	8	15	77.7	0.49	11	1.28	1.96	1.96
February.....	30.050	2.080	7	4	5	13	76.5	0.49	12	4.42	1.84	0.62
March.....	29.966	1.178	6	9	6	10	72.7	0.52	9	9.75	5.85	5.23
April.....	29.876	0.982	6	3	8	13	56.6	0.50	7	4.24	0.32	5.55
May.....	29.026	0.822	7	11	6	6	76.2	0.44	9	3.23	0.41	5.14
June.....	29.980	0.612	6	11	8	4	73.9	0.46	9	1.40	1.99	3.15
July.....	29.964	0.492	7	6	12	6	71.6	0.36	11	4.14	1.02	4.17
August.....	30.049	0.540	6	11	7	7	76.0	0.29	3	1.82	2.43	1.74
September.....	29.958	0.746	11	5	8	4	78.0	0.54	11	5.73	2.61	4.35
October.....	29.960	0.794	2	5	8	16	62.5	0.41	4	2.15	1.36	2.99
November.....	29.935	0.866	16	1	3	10	81.4	0.67	10	6.95	2.91	5.90
December.....	30.156	1.564	7	1	2	18	76.0	0.55	9	5.25	1.45	7.35
Whole Year.....	29.999	2.080	84	72	81	122	73.3	0.48	105	50.36	7.91	7.91

TABLE II.

Showing the mean temperature compared with the mean average for 45 years, the highest and lowest temperature, and the monthly range, the mean daily range, and the greatest change in 24 hours, for each month of the year 1876.

MONTHS.	THERMOMETER.					GREATEST CHANGE IN 24 HOURS.		
	Mean.	Compared with aver- age of 45 years.	Highest.	Lowest.	Range.	Mean Daily Range.	Degrees of Rise or Fall of Thermometer.	DATE.
January	31.° 1	4.° 5 +	57°	9°	58°	8.° 6	28° f	10th.
February	28.° 3	1.° 2 +	57°	-2°	59°	9.° 1	32° f	2d.
March	33.° 2	0.° 6 +	62°	5°	54°	10.° 8	25° r	5th.
April	43.° 9	0.° 5 +	67°	25°	42°	11.° 8	22° r	12th.
May	54.° 8	0.° 3 +	82°	34°	48°	13.° 8	30° r	27th.
June	68.° 2	2.° 6 +	89°	42°	47°	14.° 8	27° r	2d.
July	74.° 0	3.° 4 +	92°	52°	40°	14.° 4	22° r	17th.
August	68.° 8	0.° 1 +	90°	49°	41°	15.° 2	22° r	29th.
September	59.° 4	2.° 5 +	87°	44°	43°	10.° 9	20° r	1st and 4th.
October	48.° 1	2.° 8 +	68°	26°	42°	14.° 8	22° r	30th.
November	40.° 8	0.° 8 +	66°	21°	45°	8.° 6	25° f	3d.
December	22.° 9	6.° 6 -	44°	2°	42°	7.° 1	33° f	16th.
Whole Year	47.° 8	0.° 1 -	92°	-2°	94°	11.° 6	33° f	Dec. 16th.

The population of the State is probably somewhat more than 260,000. By the census taken in 1875, it was 258,239. Adopting what we believe to be the correct statement of the area of the State, it is more densely peopled than any other State. We make the number of inhabitants to the square mile to have been, in 1875, in Rhode Island, 244.9.

In ten years preceding the census of 1875, the population increased 39.61 per cent. The gain is greatest in the city of Providence and the adjacent towns. The manufacturing villages and townships also increased far more rapidly than the purely farming towns. Several of these are nearly stationary, or even lessening in the number of inhabitants. Thus there is a marked tendency to centralization, the growth being principally in Providence and its neighborhood, in villages where water-power is abundant and convenient, and in a few points which are favorably situated for fisheries and navigation.

This disproportionate growth of the compact and manufacturing places depends in a great degree on the influx of foreign-born inhab-

itants with their families. The number of foreigners in the State according to the census of 1875, was 71,630.

In 1850 the population of foreign birth in Rhode Island comprised 15.66 per cent. of the whole population, in 1860 it was 21.46 per cent., in 1870, 25.48 per cent., and in 1875, it had increased to 27.73 per cent.

The foreign class are found to have a larger proportion of adults in the marrying age, to be more disposed to marriage in hard times, and to have on an average more children to every marriage, than the native class. Hence, a large number of children are growing up, who are born here, but in all their associations, their early training, and the sanitary, social, and moral influences that surround them from their infancy, properly belong to the foreign class. The distinction by *parentage*, therefore, becomes more important than that by *nativity*. By far the largest part of the foreign are Irish.

There were in the State, at the time of the last census, 6,271, colored inhabitants, including a few partly of Indian descent. The colored inhabitants are so few that they have little effect on the general character of the statistics. They usually report more deaths than births, and are particularly liable to consumption. They are thought to be somewhat less subject to epidemic diseases than the whites. In several years, the registered deaths by respiratory diseases among the colored were three times as many as those by zymotic diseases.

The mortality of Rhode Island is very fully illustrated in the annual reports on registration of births, marriages and deaths:

“The number of deaths reported in Rhode Island in 1877, according to the Registration Report of Dr. E. M. Snow, was 4,450; this was 334 more than in 1876, and more than have been recorded in any previous year. The death rate for the year as given on page 48, was one to 58.03 of the population, as given in the census of 1875, or 17.2 in each thousand. In 1876, the rate was one death in 62.7 of the population, or 15.9 in each thousand; in 1875, it was one death in 59.8, or 16.7 in each thousand.

As a large proportion of the deaths occurred in Providence city, which has so large a share of the population of the State, we give the population, number of deaths and rate of mortality separately for the city and the rest of the State:

	Population.	No. of Deaths, 1877.	One Death in	In each 1000.
Providence City.....	100,675.....	1,988.....	51.9 or.....	19.25
Rest of State.....	157,564.....	2,512.....	62.7 or.....	15.94

The difference in mortality between the city and the rest of the State is not so great as it was in 1876, which was the first year in which the distinction was made. It should be remembered that in some towns in the State the returns of deaths are quite incomplete, which fact will account for some of the difference between Providence and the rest of the State."

The following Table from the same Report gives thirteen principal causes of death in Rhode Island, and shows the order in regard to the number of deaths from each, in each of the last three years, and also in the aggregate of deaths for twenty-two years and seven months, from June 1st, 1852, to December 31st, 1874:

1877.	1876.	1875.	June 1st, 1852, to Dec. 31st, 1874—22 yrs. 7 mos.
Whole Number.... 4,450	Whole Number. . . 4,116	Whole Number.... 4,317	Whole Number.... 64,514
Consumption..... 661	Consumption 655	Consumption..... 650	Consumption . . . 10,651
Diphtheria 492	Pneumonia and Conges. of Lungs 389	Pneumonia and Conges. of Lungs 400	Old Age..... 3,493
Cholera Infantum. 259	Cholera Infantum. 250	Cholera Infantum. 318	Pneumonia and Conges. of Lungs 3,471
Pneumonia and Conges. of Lungs 236	Old Age..... 241	Old Age..... 216	Cholera Infantum. 3,175
Old Age..... 213	Heart, Diseases of. 166	Heart, Diseases of. 186	Scarlatina 3,083
Heart, Diseases of. 182	Apoplexy and Paralysis 165	Scarlatina 185	Fevers, Typhoid, &c..... 2,522
Apoplexy and Paralysis..... 181	Diphtheria 159	Fevers, Typhoid, &c..... 170	Heart, Diseases of 2,295
Cancer (all kinds). 135	Fevers, Typhoid, &c..... 126	Apoplexy and Paralysis 166	Apoplexy and Paralysis 2,067
Fevers, Typhoid, &c..... 134	Accidents (all kinds)..... 114	Accidents (all kinds)..... 180	Dysentery..... 1,975
Accidents (all kinds)..... 132	Cancer (all kinds). 106	Convulsions and Fits..... 100	Accidents (all kinds)..... 1,973
Croup..... 96	Croup..... 102	Croup..... 96	Convulsions and Fits..... 1,357
Convulsions and Fits..... 83	Convulsions and Fits..... 89	Cancer (all kinds). 95	Croup..... 1,300
Scarlatina 62	Scarlatina..... 80	Diarrhoea..... 70	Hydrocephalus.... 1,064

In examining the diseases to which deaths are ascribed, we are well aware that scientific precision of diagnosis cannot be expected, in records gathered from the clerks of different towns, where the amount of general information and the modes of using terms vary. The law requires that the cause of death be certified by the attending physician; and in many parts of the State this is done. But the defects are great enough to deprive the results of value as the basis of exact and general deductions. Still, it must be remembered that many of the more important diseases are so easily diagnosticated and so generally known, that the figures may be trusted, as showing, with essential accuracy, the proportion of deaths due to them in each successive year, and as illustrating the laws of the several diseases.

DIPHTHERIA.

BY

JAMES H. ELDREDGE, M. D.,
OF EAST GREENWICH.

DIPHTHERIA.

The great prevalence of diphtheria in this State, and I may say everywhere throughout the country, the great mortality which attends it, and its very distressing character, have very properly suggested it as a subject for investigation and discussion. It is not without distrust of my ability to do justice to a subject of so much importance, that I have, in obedience to your commands, Mr. President, prepared a short paper, as an opening to a discussion, which I hope may bring out from others something of more value than anything I can present myself. The first death from diphtheria was recorded in the town of Warwick in 1861, and in East Greenwich in 1864. Since that time up to the first of January of this year, the records show from this cause eighty-one deaths in these towns. They have occurred in the following order: In 1861, 12; 1862, 5; 1863, 5; 1864, 11; 1865, 5; 1866, 2; 1867, 1; 1868, 2; 1869, 5; 1870, 7; 1871, 11; 1872, 2; 1873, 2; 1874, 7; 1875, 3; 1876, 2. Four in the month of January, 1 in February, 2 in March, 4 in April, 6 in May, 6 in June, 5 in July, 11 in August, 5 in September, 8 in October, 15 in November, and 14 in December. Sixty-six of these were under six years of age; about equally divided between the sexes. It has at no time been epidemic, generally breaking out, as it seemed, sporadically, in different localities, confining its ravages to one family, or to a very small neighborhood, carrying off three out of five, or four out of seven children in a family, and then disappearing for a whole year, or showing itself three or four times in this way in some years; the farm houses in the country being quite as often selected as the more crowded houses of the village. In the summer of 1866, in the month of August, three children in the family of a well-to-do-farmer died in one week, and there were in that year only two other deaths from this cause in the town of

Warwick. These eighty-one deaths may be said to represent about five times as many cases, for the proportion of fatal cases in these circumscribed, local epidemics has been, as near as I can estimate it, about 20 per cent. The disease as it was first recognized in 1861, had the same malignancy that it has now, one of its features being the fact that the first cases in these local outbreaks were generally the fatal ones. In the year 1877 there have been reported in the towns of Warwick and East Greenwich, forty-seven deaths from diphtheria, more than from any other one disease, diphtheria having this year reached that bad eminence so long held by consumption. Of these reported deaths, one was in April, four in June, one in July, four in August, twelve in September, twelve in October, four in November, and eight in December; thirty-five were children under six years of age, ten were over six and under ten, and four over ten; twenty-four males and twenty-three females. These forty-seven deaths represent approximately two hundred and thirty-five cases in a population of about fifteen thousand. This is the sum of my experience with diphtheria since its first appearance under its proper name. I presume it differs but little from the average practitioner in the country, and that other parts of our State have had about the same proportion as that of Kent County over which my personal observation extends, and that the increase that we had this year has not been peculiar to these towns.

These statistics confirm the statements of Dr. Snow, that the fatal forms of diphtheria are very much confined to children under ten years of age, and that its period of greatest prevalence is in the fall and early winter months.

The first question which presents itself in the discussion of this subject is its history: Is diphtheria a new disease, which has shown itself and prevailed in an epidemic form only in the last half century? This is rather a popular than a professional inquiry, and may be answered without hesitation in the negative. This disease is known to have existed in remote times, and is described by the earliest medical writers. It is only from the fact that it has been brought to notice under a new name, which its most important pathological feature has given it, that this question has in any way arisen. As the *malum Egyptiacum*, *Angina maligna*, *Cynanche maligna*, and as *scarlatina* without efflorescence, diphtheria has been recognized and accurately described by the standard authorities of the last century. In the *Encyclopedia of Practical Medicine*, of Forbes, Tweedie and Conolly, published in England about 1842, and in this country republished, under the supervision of Dr. Dunglison, in 1845, no place is given to diphtheria as a distinct

disease, but it is accurately described, and the work of Bretonneau referred to in the article on diseases of the throat, and again under croup by Cheney, and the latter writer protests against classing with croup, a disease in which there are marks of septic changes in the blood, and in which the pulse is but little accelerated, the skin harsh and dry, the breath fetid, and the debility extreme. Under scarlatina, varieties of the disease are described as scarlatina without efflorescence, which would now be called diphtheria. I can myself remember cases of this kind in my father's practice, and in the early years of my own, scarlatina without the rash, which would now be called, and very properly, diphtheria. It will be generally admitted that this is not a new disease, but that it was recognized and known to prevail extensively as an epidemic in different countries, and that in the due course of pathological investigation, its characteristic features have been found sufficient to give it a place in modern nosology, and separate it from the kindred diseases with which it has been confounded.

What are the causes of diphtheria, and to what can we attribute its marked increase at the present time? There can be no doubt that faulty hygiene, or disregard of the laws that regulate the common affairs of life in every village and in every household, will contribute to the increase and aggravate the malignancy of this disease as well as of all other diseases. Where there are such decided characteristics, such peculiar features, it is reasonable to suppose there must be some specific cause, some noxious agent which breeds diphtheria and nothing else. Whether this noxious agent may be the spore of some fungoid vegetation, which pervades the atmosphere, at certain times, everywhere, but, like the spore of the mushroom, only starts into active growth under favorable conditions of soil and temperature and proper degree of moisture, is a proper question. Seeds of many plants we know remain dormant for many years, sometimes for centuries, and then, under changes, germinate and grow as if recently planted. May it not be so with the seeds of disease, and of this disease especially, everywhere present, but only starting into active life under the conditions which favor their growth;* these conditions being all those depressing influences which we may sum up under faulty ventilation, defective food and impure water, and the peculiar attraction which the system presents between the ages of two and ten years, and the favoring influences of certain seasons.

* An intelligent gardener making up his beds for mushrooms, bestowed much more care with the compost and the amount of light and heat and moisture, than with the seed. Indeed, he said he "would rather take his chance for a crop without sowing seed, than with careless preparation and seed in profusion."

Whether the noxious agent which may be supposed to be the specific cause of this malady is a certain fungoid, cryptogamic vegetation, which attaches itself to its favorite locality, producing first a local disease, and then secondarily, affecting the general system by absorption, or whether the reverse is the order in which the symptoms progress, is not yet fully settled, and is a point for discussion, and an important one; for if we can arrest the disease by destroying at the outset, before the system is affected, these local manifestations, its further progress may be prevented. My own observation, which is, of course limited, leads me to believe that diphtheria does not differ from other diseases of kindred nature, that it has its period of infection and incubation, a series of premonitory symptoms, and then the local affection and general constitutional disturbance.

Whether it is contagious or infectious is another point upon which there is a great difference of opinion; but this, after all, may be more a difference in mode of expression than any great difference in meaning. If we say that a disease is not infectious, unless it is almost invariably the rule that those who are exposed to it, unprotected, take it, as in the case of small pox or measles, then few diseases are infectious; but if, on the other hand, we call all those diseases infectious which a person is more likely to contract by coming within range of their influence, than by keeping out of it, then the number of infectious diseases is very large. If this latter rule applies, diphtheria is clearly infectious. The risk of contracting the disease is much less kept at a distance, than permitted to approach it. When, however, cases occur in clusters, as they generally do, it may not be the infection, but the primary cause which produces it, the same in the successive cases as in the first, and this view is supported by the fact that the first cases are generally more violent than the last, when we might be led to expect that the later cases, if the result of infection, would be more malignant as the virus became more concentrated. There is no dispute about the fact of its contagious character. It is not an unwise precaution to isolate all cases as far as practicable, and to keep all children under ten as far removed as possible, from the presence of the sick room.

We can hardly err in making a diagnosis of a well marked case of diphtheria, for it presents appearances which are seen in this disease alone; and the train of symptoms which follow are such as follow diphtheria and diphtheria only. All cases, however, are not well marked and there may be much uncertainty in deciding at the outset the true character of some slight, obscure or irregularly developed case. All inflammations of the fauces should not be hastily pro-

nounced diphtheria, but only when we are obliged to do so by the pathognomic sign which this disease presents, should we use the formidable name. Not unfrequently the messenger who comes for the physician announces the nature of the disease we are to meet; and generally the announcement is right, although neither the messenger nor any one in the family or neighborhood may have seen a case before.

After a period of malaise varying from a few days to a few hours, a swelling and soreness of the throat is complained of, at the same time there is swelling of the glands of the throat and neck not only immediately outside the inflamed parts within, but under the chin and on the neck behind the angle of the jaw. If examined carefully a white patch, like a piece of soiled white kid, will be seen adhering to the surface of the tonsil or adjacent parts. This spot is not like a cut out ulcer lined with the membrane; but a patch loosely laid on to the inflamed surface, but found to be incorporated with the mucous membrane if the attempt is made to remove it.

The outward swelling of the glands of the throat and neck is a feature almost as marked as the false membrane within—as if these faithful sentinels had exercised their functions to the utmost extent to exclude from the blood the poison which the absorbents had taken up. As the disease progresses, the nasal passages are invaded, the peculiar inflammation extends through the lachrymal duct to the eye and to the ear through the eustachian tube, and spreads downward to the larynx and trachea, too often with fatal results. The countenance is puffed or swollen and of an ashy hue. The blood is vitiated and extravasated into the tissues and escapes in hemorrhages in every form; and the fetor from all discharges is very marked—sometimes plainly perceptible before entering the sick room.

This is a brief description of a case so marked as to be recognized by those who see it for the first time.

When these decided manifestations are not present, we may suspect diphtheria if the constitutional symptoms are disproportionate to the local affection; where there is long continued loss of appetite, and loss of strength and of flesh; and we can have no hesitation when any of the forms of local paralysis which are peculiar to diphtheria show themselves.

With scarlet fever diphtheria has been often intermixed and confounded. In the first we have not only the efflorescence, but high febrile excitement, high temperature and rapid pulse through the whole course of the disease. The swollen glands frequently suppurate

and local and general dropsy, with albumenuria follow, and not the peculiar forms of paralysis, as in the latter. In scarlet fever a second attack is the exception to a general rule,—in diphtheria, after one attack, there is a tendency to a recurrence, rather than exemption.

Are membranous croup and diphtheria identical? This is a mooted point; but generally admitted to be decided in the negative. Diphtheria may result in croup, but croup will not result in diphtheria. There is false membrane in both, but in croup it originates and is confined to the air passages, while in diphtheria the air passages are affected secondarily; in one the fever is active, in the other typhoid; in one the cases are single, in the other they come in groups; in one the local affection predominates, in the other constitutional symptoms are as strongly marked as the local.

In the prognosis of diphtheria we have the same uncertainties as in scarlatina. Some cases are so slight as hardly to be recognized, but still not free from danger, and these as well as the graver cases, are followed sometimes by symptoms which may prove fatal. Albumenuria, as in scarlatina, is a dangerous and very common complication, the swelling of the sub-maxillary and cervical glands is in some degree a measure of the extent of the disease. Hemorrhages, and fetor of the breath and discharges, are very unfavorable indications. A temperature of nearly a natural standard, and a pulse regular and slow, cannot be taken as a sign of encouragement, as it is in other febrile diseases, nor can the fact that the mental faculties remain, sometimes in the worst cases, unclouded and undisturbed to the last moment of life.

The treatment and means of arrest and prevention are points of far greater interest in the discussion than any others. In a disease so variable and capricious, where at one time we find almost all cases fatal under all treatment, and at another all recovering, whether treated or not, it is difficult to fix upon facts or to arrive at correct conclusions. The treatment is local and general. It is important that in pursuing one we should not ignore the other, on either hand; the difference in opinion in regard to the order in which the symptoms make their appearance, should not materially modify the treatment, although greater or less importance may be put upon local applications, as the opinion prevails that the local manifestations take precedence of the constitutional symptoms, or the reverse. One procedure is not incompatible with the other, and both are necessary. If in the order of progress, the local symptoms come first, even then, at the earliest moment of observation, the system is already affected by the rapid development

and absorption of the fungoid vegetation into the circulation and into the tissues, and into the recesses of the body where no local application can reach them. Nor are the local applications of less importance if the system is primarily affected. The advocates of these different theories do not differ materially in their mode of treatment, so that it is of but little consequence, practically, upon which side one's action is based, being essentially the same. The "savage energy" with which powerful caustics were applied to the diphtheritic patches, by recommendation of Trousseau and others, has long since been discontinued, and milder measures substituted, in the form of antiseptic lotions and gargles, less potent and less disagreeable. We can remember with how much reliance we used the solid stick of nit. silver, or very strong solution of the same, in all these cases, as an essential part of the treatment, and how we learned after a while that a weaker solution answered as well, and finally that the weaker we made it the better it was, and now I believe that it is but little used for this purpose. The chlorate of potassa, with the addition of muriated tr. of iron, or muriatic acid, the sulphocarbolate of soda, permanganate of potash, borax, alum, salicylic acid, and other preparations of this nature, have been found to accomplish all that can be done in the way of gargles, lotions and topical applications.

Alcohol, in its various forms is a good topical application. Lumps of sugar, saturated with spirits of camphor, give relief where the patient is old enough to use it and appreciate it. To sustain the system with food, stimulants and tonics, until the malady has run its course is the chief indication: Milk and eggs and broth and juice of beef, with wine and whiskey and brandy. Milk is generally the most agreeable. The great difficulty is to overcome the repugnance to all food. When it is found impossible to administer it by the mouth, it may be given by injections, as may be the medicines. Quinine as a tonic in one, two or three grain doses, suspended in water with powdered liquorice root, is most reliable, and in this way easily taken. Muriated tr. iron, cit. iron and quinine and salicylic acid, with borax, have all been used with benefit as a change, or alternately with the quinine. Hot vapor and sprays are of great service, and sometimes the only means we have of making topical applications in small children, and sometimes in those of larger growth, who happen to be a little perverse. Cologne or rose water, added to the solutions used makes them more acceptable. Vapor of lime water or of vinegar or of simple water hastens the process of suppuration and detachment of the false membrane. Stimulating applications to the outside are of no service,

and perhaps add to the discomfort. If it is thought that these cryptogamic vegetations, which characterize this disease, can be easily destroyed, either by medicine administered internally or by topical applications, we have but to refer to experiments made for the purpose of testing the power of different remedies. It was found by Oertel that exposure for twenty-four hours to 14° and 7° Fahr., and to boiling water for fifteen minutes, failed to destroy their vitality, or even their power of proliferation. And the same result was obtained by treating with the solutions which we so much rely upon for the destruction of these organisms, chlorate potash, chlorine water, quinine, sulphur, &c. These were no more effectual than hot water or the freezing mixture. Alcohol was found to answer the purpose better than anything.

A very nice point comes up very often for prompt decision. In the management of these critical cases, where the false membrane is found to extend to the larynx and air passages, shall we recommend a resort to tracheotomy or not? Can there be no rule to guide us? If there is such a condition as to give little or no chance for recovery without this complication, if the glands of the neck are very much swollen, if the nasal passages are affected, the complexion bad, and the breath fetid, we should but bring odium upon the operation, if we should resort to it; but if without this complication, there is a good prospect of recovery, if the general system is in a good condition, the operation should be recommended and resorted to as soon as practicable after the extension of the false membrane into the windpipe is discovered, for it is certain that this state of parts does not tend to recovery, and unless relief is given by an operation a fatal result is inevitable. The complications which come in the period of convalescence, and the sequelæ which follow the malady are more troublesome, and more often fatal, than in any other disease. Syncope is a common occurrence, and is always dangerous. It does not appear to be owing to mere debility, but to some more serious cause, obstructions in the large blood vessels or heart. The peculiar vegetations, which are supposed to characterize this disease, are not confined to the surfaces upon which they appear, but pervade the tissues and vessels and form collections, which not only plug the capillaries, but the larger vessels. The forms of local paralysis, which constitute one of the chief diagnostic marks of diphtheritic affections, are not only exceedingly annoying, but sometimes dangerous. Muscular fibres, which are covered by micrococci, are said to degenerate and slough, impairing permanently the parts affected. I have known, during the last summer, two cases of complete paralysis of the throat, so that the voice was not only lost,

but the power of deglutition; fluids of the blandest sort flowing back through the nose, and solids causing alarming fits of strangulation. Both of these cases were fatal from debility. Food could not be taken in sufficient quantity to sustain life, although they were nourished as far as possible by injections into the rectum. The tendency in these cases of paralysis is generally to slow recovery. They do not respond very sensibly to treatment with strychnia, or to galvanism in its various forms, means which are generally resorted to and indicated. Prophylactic measures are all important in times of diphtheritic epidemics. Not only should precautions be taken against infection and contagion, but every care taken to remove those unwholesome surroundings which are to be found almost everywhere, and which increase and aggravate all kinds of disease, and may be said to generate this. That all sorts and conditions seem equally affected, is not a proof that faulty household arrangements do not favor its increase. The modern improvements in the way of cess-pools and covered drains, unless properly constructed, are no better than the unsightly open drains and slop receptacles so common in the farm house in the country; and the convenient bath room and water closet are not always an improvement on the more remote privy. It is well to enquire closely into the quality of the air we breathe, particularly in the night time; what water we drink and what food we eat.*

I have given in this brief way, Mr. President, the sum of my own experience and observations in this malady as it has appeared in the last sixteen years in that part of the State over which my circuit may be said to extend. Not proposing to offer any new theory, but to express an opinion upon some of those points which may be consid-

* During the summer of 1877 the brine accumulated daily in making ice-cream, amounting to three or four pailfuls, was thrown into a pit dug in the garden about thirty feet distant from the well, on the up hill side. Early in the fall the water in this well became brackish and unfit for use. Sometime in November, another well across the street, full one hundred and fifty feet from the place of deposit for the brine, was affected in the same way, the water being so salt as to be perceptible in tea and coffee and altogether unfit for use.

The region about was underlaid with rock fifteen feet from the surface having a dip to the north and east, in the direction of the affected well. The overlying earth was made up of sand and gravel and the rock was traversed with seams. If, under these conditions, water holding in solution common salt can be carried so far, is it not possible that holding in solution impurities less palatable but more hurtful, it may take the same course? The cess-pool and covered drain are somewhat modern improvements about the better class of farm houses and in the more recently constructed tenements in factory villages. May not the accumulation of filthy water in these bottomless pits, and of other filth in privy vaults in close proximity to the wells contaminate the drinking water in an insidious way, only to be made known by the prevalence of some disease like typhoid fever or diphtheria? And would it not be a wise precaution to have all these receptacles for filth made water tight? and would it not also be a wise precaution so to examine the natural under-ground drainage as not to locate wells in the course of flowage from contaminated sources, even at the expense of inconvenience as to distance, or cost of digging them?

ered as not yet fully settled. I have stated that in the towns of Warwick and East Greenwich, from the 1st of January, 1861, to the 1st of January, 1877, sixteen years, there have been recorded eighty-one deaths from diphtheria; that sixty-six of these were children under ten years of age; that more deaths were recorded in November and December than in any other months, and that the number of deaths may be said to represent about four hundred and fifty cases; that in the last year in these towns, forty-seven deaths have occurred, manifesting the same peculiarities of age and season as in the sixteen previous years. Second—That a disease of such very marked features must have a specific cause. Although, as in other diseases, this noxious, specific agent, whatever it may be, is rendered more actively virulent by any unfavorable conditions of living; that it is infectious, if infection may signify a greater liability in those who are exposed to it than in those who are kept away, but that it is not invariably so, like small pox; that it is contagious beyond a doubt. Third—That it may be taken for scarlatina, from which it differs, however, in some prominent points; the fever is slight after the first few days; the pulse is but little accelerated, and the temperature but little raised. The swollen glands rarely suppurate, and the sequelæ come in the form of local paralysis, and not as dropsical effusion; that diphtheria may be croup, but croup is never diphtheria. Fourth—As to the order in which the symptoms are developed, I am led to believe that the system is generally affected before the local symptoms appear, and that the disease is not arrested, if it were possible to do so, by removing the local manifestations. Fifth—That the prognosis as in scarlatina, is uncertain, as the slightest cases may be followed by grave symptoms which may prove fatal; that the swelling of the cervical glands is some measure of the extent of the disease, and that hemorrhage and invasion of the nasal passages, and the larynx are almost invariably fatal indications. Sixth—That the treatment is with topical applications much milder than those first used; that the constitutional treatment should have for its object the support of the system until the disease has run its course—tonics, food and stimulants—and that it is not possible to destroy entirely the characteristic vegetations with the usual lotions and gargles, even if they could be reached; and also, when in the course of the disease the larynx is invaded we should recommend tracheotomy as early as possible, if the system is in such a condition as to warrant it, and, lastly, that preventive measures are quite as important as the treatment, and they consist of the careful observance of general hygienic rules.

ON CAUSES OF
ILL HEALTH AMONG WOMEN.

BY

MISS ANITA E. TYNG, M. D.,
OF PROVIDENCE, R. I.,

MEMBER OF THE RHODE ISLAND MEDICAL SOCIETY. CORRESPOND-
ING MEMBER OF THE BOSTON GYNÆCOLOGICAL SOCIETY.

ON CAUSES OF ILL HEALTH AMONG WOMEN.

Many of the causes of ill health among women having their origin in the fashions and customs of the day are supposed to have but temporary effects, as may be the case sometimes, but we are apt to forget heredity. The things which are truly only of the present, will change whether they are attacked or not; to get at and to prevent evils we must work now for the next generation, looking upon each child as a future grandparent, and teaching it that it owes a duty to its posterity and through them to the world, which they have the power to bless or to curse.

To begin at the root of the matter, each man and woman should consider the prenatal influences of their offspring, and endeavor to make these as perfect as possible, according to the best intelligence and information they have. The health of women during the child-bearing period, both the mental and moral, as well as physical condition, their work and recreations, their surroundings and their thoughts, are reproduced in their children, and while some attention is given to the so-called and much mis-called mother's marks through frights and whims, and which often only show the weak-mindedness and lack of self-discipline of that mother, little attention has been paid to their prevention, or to the good that might be wrought out by the well trained mind and disciplined character of *both* parents.

After its birth immediately there begins a mismanagement which affects its health and longevity. Through ignorance and superstition every hygienic law of food, clothing, bathing and sleeping, is abused.

Then when nature demands active exercise for growth and muscular development, repression is the only idea, the convenience of the adult being considered of more importance than the well being of the child. The primary public schools, presided over chiefly by young girls who have not themselves learned self-government, are governed also by repression and confinement to one position for a length of time difficult even for adults. Until puberty, the sexes are about equal mentally and physically, but then the idea of repression shows itself more forcibly upon girls. The study of anatomy teaches of the growth and development of bones in the growing child. The pelvic bones which have had several centres of ossification begin to unite at about the thirteenth year, three bones joining into one. The sacrum also ossifies more perfectly, completing this process at about the twenty-fifth year. During these years, when the whole future health of the woman, depends upon the perfectness and completeness of this pelvic development, and when girls should be allowed the greatest freedom of muscular movement, *repression* is still more enforced. She must not romp, she must have quiet manners, she must be shut up indoors until her vital powers are reduced. When she does go out she must be dressed to form such a figure as is demanded by the ignorance of fashion; long dresses, the weight at the bottom, furthest from the point of support, the weight and heat of which falls upon the growing pelvis with excessive and unequal pressure, changes the natural gait. Close fitting, if not too tight corsets, misnamed supports, which impede respiration, circulation, digestion and the peristaltic action of the intestines, thus producing one of the chief causes of constipation with all its recognized train of evils, so much more common among women than men; weaken the power of the muscles which aid in child-birth; also pads over the breasts which impede their natural growth and deprives them later on of one of the privileges of maternity. No thought is given to preparing the body to facilitate future child-bearing. The spine is heated and distorted, and though women have and wear more clothes now than did those of the last century, they are ill protected just where most clothing is needed. Cold feet and a hot head is a frequent condition; the feet and limbs are not warmly dressed, the head is heated by false hair and by wearing the bonnet indoors. Much has been said on dress, and efforts made at reform so far as underclothing, and yet even our wealthiest women who have least excuse are insufficiently clad. Efforts in this direction have also had some effect in regard to the size of the waist, but there is still too much compression,

The excitements of social life are greater in this country than in Europe, and girls are allowed them at an earlier age; the late hours and insufficient sleep during the hours authorized by nature, all tend to induce early and excessive menstruation, to disturb the nervous system, and to derange the function of every organ, making us notorious among nations as nervous temperaments and subject to nervous diseases. It is not merely going to places of evening amusement and excitement, as concerts, theatres, balls, &c., but too early partaking in them themselves, as in exhibitions of all sorts. Our public schools set a bad example in this.

Fiction literature gives girls romantic and unreal ideas as to marriage and domestic life; later, when they come to find the reality different, they grow to hate these cares and become restless for excitement. "*Si votre fille lit des romans a dix ans elle aura des vapeurs a vingt.*"

Among the poorer classes hard work is begun at this time of life, combined with ill ventilated homes, especially sleeping rooms, and such food as does not help in the healthy development of bone. Among the wealthier classes, indulgences in too rich and over stimulating food develop those national diseases, dyspepsia and catarrh. Dyspepsia was entailed upon us by our grandparents, with their salt pork and fried meats eaten by them even through the summer season; now we are passing it on to the next generation by our pies, doughnuts and highly seasoned food; even our school girls must have sweetmeats, cakes and pickles. Out door pursuits and games calculated to create muscular power, are discouraged because they do not accord with the general idea that an appearance of delicacy in form and complexion is more suitable for women. Here, also, we present a contrast to European women. The imperfectly performed light gymnastics drearily gone through with in our schools, is supposed to be sufficient to develop all the muscular power needed. One might as well teach children to play and laugh by rule, so far as any real development of muscle or mental relaxation is obtained. A more healthy performance of natural functions would promote efforts for the prevention of disease and secure more regularly established menstruation with more ease in its performance. "As the importance and relative value of a living being may be estimated by the length of time it takes to attain perfection, I may reasonably infer that the longer the reproductive apparatus lays dormant in women, the stronger will be their constitution, the more harmoniously will its functions be performed, and the more favorable will be the influence of this apparatus on the whole

system.”* Owing to the various excitements and stimulations above mentioned, first menstruation occurs early in this country and earlier among the higher classes than in the poorer. Unfortunately ignorant of these conditions, many mothers adopt a forcing system by medicines, baths, &c., often thereby destroying good health; while others allow girls to grow up in ignorance of this coming change, and when taken by surprise, the shock, the fright leads them into imprudences which result in hysteria. Many diseases are thus traced to the bad management of girls at puberty. “The effects of a badly passed puberty are seen in an over excitable circulation, excessive nervous susceptibility, dysmenorrhœa, sterility, * * * becoming at last victims of consumption or other disorders of which the foundations had been laid in an improperly conducted physical and moral education.”†

Physiology is taught only in the high schools which a large portion of the future mothers never reach, and there it is taught only partially with much positively needful for the youth, of both sexes, to know, carefully culled out. They are thus left to learn and continue to hand down to posterity, from the ignorance and superstitions of servants, or from the vulgar among their associates and from the obscene literature which is being thrown broadcast among our schools, what they should learn only from parents, or teachers capable of making them respect the highest functions of human nature. If the half time system, which has worked so well in England and Germany, could be introduced into our public schools, at least in the primary and intermediate grades, and the remainder of the time applied to systematic training in industrial work for, and by, both sexes, the working classes of our population would be better prepared for self-support, have a more healthy physical development and become better citizens. The graduates from our high schools are crowded with studies which they have no use for in private life, and which they soon forget, because crammed only to get their averages and percentages of rank, to obtain a diploma, that being the highest and often the only goal and without which they will not easily get situations as teachers, and they are fitted for no other career. They cannot all be teachers, the supply is greater than the demand, meanwhile other fields are waiting for laborers.

I place ignorance among the chief causes of evils, although I am frequently met with the argument that women have had time and op-

* “Preservation of the Health of Women,” E. J. Tilt, M. D., England.

† “Diseases of Women,” C. D. Meigs, M. D., Phil.

portunity to learn differently. Time is not so much needed as encouragement, or rather the *cessation of discouragement*. Women often see evils before them, know that they are evils, could be and should be remedied, but they do not know how to remedy them. Complaints are met with the idea that the right lies in making the best of, and being satisfied with what is. It may be suggested here that one remedy lies in the dissemination of *proper* knowledge by authoritative bodies, such as the Boards of Health in the various States. I say proper, because there is so much worse than useless trash learned through almanacs and the advertisements of empirics.

Women have generally been taught that they are to marry, to be mothers, and housekeepers. They have not been taught how to make marriage beautiful; and neither sex is taught the value of a power of adaptation to each other's character, and when the fruit of an inharmonious marriage is nervous and ill-tempered, the blame is laid on Providence, instead of where it rightly belongs, on the lack of knowledge of the laws which that Providence made, and meant should regulate marriage and procreation. But it is not only with the inharmonious marriages, in the best there exists an ignorance of child-bearing and its results, a forgetfulness that motherhood is the crowning glory of womanhood, which leads to an infinity of methods for the prevention of conception not necessary to refer to directly, for those who are ignorant of them are blessed and rewarded in their ignorance, —for those who do use them, there is always the punishment which nature awards her broken laws. I have frequently given my opinion for years past, that this prevention of conception leads to a large part of the diseases peculiar to women. Poor little Pip, in "Great Expectations," spoke as the representative of a numerous class when he said, "I was always treated as if I had insisted on being born in opposition to the dictates of reason, religion and morality, and against the dissuading arguments of my best friends."

I quote from an address by Prof. Maudsley, of University College, London, the following, because I want these ideas more widely known and meditated upon: "Take notice how little people ever think of the power which they have over their own destiny and over the destiny of those who spring from them! How amazingly reckless they show themselves in this respect! They have continually before their eyes the fact that by care and attention the most important modifications may be produced in the constitution and character of the animals over which they have dominion—that by selective breeding an animal may almost be transformed in the course of generations; they perceive

the striking contrast between the low savage with whom they shrink almost from confessing kinship and the best specimens of civilized culture, and know well that such as he is now, such were their ancestors once; they may easily, if they will, discover examples which show that by ill living peoples may degenerate until they revert to a degraded state of barbarism, disclosing their former greatness only in the magnitude of their moral ruins; and yet seeing these things, they never seriously take account of them and apply to themselves the lessons which lie on the surface. They behave in relation to the occult laws which govern human evolution, very much as primeval savages behaved in relation to the laws of physical nature, of which they were entirely ignorant,—are content with superstitions where they should strive to get understanding and to exert intelligent will. They act altogether as if the responsibility for human progress upon earth belonged entirely to higher powers, and not at all to themselves. How much keener sense of responsibility and stronger sentiment of duty they would have if they only conceived vividly the eternity of action, good or ill; if they realized that under the reign of law on earth, sin and error are inexorably avenged, as virtue is vindicated, in its consequences; if they could be brought to feel heartily that they are actually determining by their conduct in *their* generation what shall be predetermined in the constitution of the generation after them! For assuredly the circumstances of one generation make much of the fate of the next.” Thus it is that people pay no regard in marriage to the evils which they bring upon their children; or in their lives to the sins by which the curse of a bad inheritance is visited upon them, and neglect to apply knowledge to the improvement of the race. When through more enlightened education, parental responsibility shall be placed on higher grounds, not only disease, but crimes will diminish, and in time we may “produce, if not a higher species of beings than we are, a race of beings, at any rate as superior to us as we are superior to our primeval ancestors.”* Too much cannot be said on the subject of heredity until it is believed, understood, and acted upon, for we have only entered upon research in this direction. As there cannot be good wine without fermentation, so every new movement has its opposers to raise discussion; thus “agitation of thought is the beginning of wisdom.” The objection has been raised that the belief in heredity is used too frequently as an excuse for various wrong doings and criminalities. This so far as true is not because the laws of heredity are too well believed and understood, but rather the contrary; and that there

* Mandaley.

is a neglect of their proper application, and these cases serve to illustrate that the inheritance was not recognized early enough in the individual and care taken to eradicate it or to stimulate the power and duty of self-control, and such qualities of mind and body as tend to oppose the natural bias, and which, by such care, one of the most fruitful sources of disease and crime may be diminished; for many things harmful to health and character, sound body and sound mind, are under human control. "When deviations or violations of the normal standard of physiology, perfect in structure and healthy in function, are continued through two or three generations, their effects become more marked and intensified. As all these changes are brought about by human agency, the remedy is lodged in the same hands."* "So to observe nature as to learn her laws and to obey them, is to observe the commandments of the Lord to do them."†

As to housework, with all its monotony of routine, its confinement, often to ill-ventilated rooms, its constant wearying muscular movements, its long hours of work, its lack of change of thought and scene, not one of these conditions changed even during the periods of child-bearing, what wonder that women break down and wear out? What other fate could be predicted for them? These influences can not be salutary either to bodily or mental health. Here, also, ignorance plays a large part. Many persons who consider themselves good cooks would be astonished to be accused of being the cause of indigestion, of diseases of the skin, of the blood, of the nerves, &c., &c., in their families. There is now a movement at work in New York and Boston, and about to begin in Providence, for the training of cooks. Boston has cooking clubs of ladies, not in training for servants, but for their own improvement. These schools are not for the teaching of making doughnuts, pastry and such already too common mixtures and compounds, but to teach hygiene and chemistry, and such principles of physiology, that in the generation to come we shall know what material should be eaten by each individual for the necessities of his or her harmonious and equable growth and development. Such a training school should be encouraged by the whole community. Also, for teaching the preparing of proper nourishment for the sick, to take the place of the wretched slops now too frequently used. Also, training for other kinds of housework, that by more orderly method, time and steps and back-aches may be saved. Much that is valuable has been said and written by practical women on the organization of

* "The prevention of disease, insanity, crime and pauperism." A paper read before the Conference of Charities, Cincinnati, May, 1878, by Nathan Allen, M. D., Lowell, Mass.

† Mandaley.

household labor; when these ideas meet with more understanding and encouragement, so that they can be acted upon, we shall see fewer worn out women, consequently healthier ones, and healthier offspring.

However good the training it cannot be properly carried out until there is more improvement in the building and arrangement of houses, and for this we need women architects who will best know the necessities of women in this respect. There are in this city thousands of rooms which can *not* be ventilated thoroughly, which are not properly lighted, where work of any kind cannot be done to the best advantage, and which are choked by the fumes of tobacco and sink drains, and the odors and smoke of cooking. Many an overworked woman into whose life few bright leisure hours ever come, has thought seriously, deeply, broadly on these subjects, but feels helpless to change anything. She has no time to study, scarcely to converse with others, and in the attempt to draw her out to take part in some fresher, newer ideas and action, one feels that so long as the daily life is a perpetual struggle for existence, efforts to rouse the mind to other considerations seem unavailing. While speaking of cooking, I cannot forbear quoting a few sentences from an interesting and ably written paper by Mary G. Ware, for the Woman's Education Association, on "Prevention of Crime among Women." "Foul air nauseating the stomach, bad cooking irritating it, insufficient food exhausting it, want of sufficient clothes and fuel chilling the circulation, each or perhaps all together, stimulate the appetite for some kind of intoxicating drink." "Another efficient influence would be schools where women could be taught to cook in such a way that the family table should be a comfort and satisfaction. The dissatisfaction of the stomach which follows the eating of badly cooked food produces a desire for intoxicating drinks, so that the good cook promotes not only health, but morality." "The opening of diet kitchens in several cities is a movement in the right direction," where regulated so as not to encourage idleness and pauperism, "for the prevention of intemperance by the suppression of its causes." With the brain clogged by foul blood because the lungs are clogged by foul air, how can we expect high or even intelligent moral action? How much do the higher classes do to prevent, how much to encourage these evils? It has been said that it is easy to be a good Christian for one who has a sound spine and a sound stomach, so it is easier for one with bodily wants well supplied to resist the temptations of liquor and to refrain from crime.

In addition to cooking schools there is needed instruction on the importance of well ventilated and clean houses, and especially among

the poorer classes, of the necessity for the removal of all *effete* matters, and of the need of a good blood and bone making diet, in place of the half starving diet of bread and tea, which unfortunately has made its way among our working classes of all sorts, but especially of sewing women, as the popular diet. It is not wholly, if at all, a question of means to obtain better food, for tea is not cheap, but to the ignorance of cooking and of what is suitable and wholesome for them.

A cause of ill health among the women who work in mills, beside those included in what has already been said, are injuries to the digestion and to the nerves, by the habit of tobacco "dipping," not confined to the south, but practiced considerably in this State; these women also suffer from overheated air, whether dry or laden with moisture; and in cotton mills, dust from the carding process, (less since the modern improvements than a few years ago.) Among shop girls there is confinement in over-crowded, badly ventilated shops, deficient sunlight and outdoor exercise, air exhausted by gas and heated over repeatedly, too much standing, infrequent and irregular meals. After standing several hours, exhausted and needing good food, they are allowed often so short an interval at mid-day, that there is not time to go to their cheap boarding place or home, and are too poorly paid to afford a meal at a restaurant, they too soon learn what affords the most stimulus for the least money. Said an older shop girl to one recently from the country, "Don't waste your money on pie, get a glass of gin, its cheaper." Those who do not reach this degradation, yet take inordinately of tea or patent tonic medicines. "If the temperament be nervous and the work mental, there is much more danger from the use of stimulants than when the avocations are manual."* "As a rule, people are under-fed. This is especially true of women. The tone of the system is thus lowered and local congestions of different parts of the body are produced."† Diseases of the digestive organs, consumption and uterine irregularities prevail with this class of women.

The wealthier classes do not escape disease because of not being obliged to work. "In a discourse upon the consequences of employments, the case of the unemployed has really no place; yet this negative condition of doing nothing has its consequences, and very serious ones too, in connection with the health of its possessors. The lack of definite occupation, or of occupation satisfying the mind and conscience, and which is fraught with blessing, is especially the misfortune of

* Rachel B. Gleason, M. D.

† Wm. A. Hammond, M. D.

women, more particularly so in the case of unmarried women, in so called 'easy circumstances.' Among them may be seen the sad consequences of a purposeless, useless, selfish existence. What a lamentable array of disorders is their lot!—a group of nervous ailments, largely associated with the ill-defined and ill-understood condition called hysteria. "It is a praiseworthy feature of the present day that great endeavors are made to find employments for women, to enlarge the bounds of pursuits calculated to arouse their interest, and to foster physical exertion."* "In young women without useful occupation, the moral nature becomes perverted in addition to derangement of bodily health; the mother's sympathies too often only foster the morbid proclivities by insisting on the delicacy of constitution, and the necessity of various artificial methods for restoration. Such a girl is not the victim of high pressure or mental strain in her own person, but she may inherit a susceptible brain from an over-worked parent. The remedy is work, not rest, occupation, not idleness—a luxurious life is her curse. Insanity as well as hysteria is developed by such a mode of existence. Life must have an aim, although to achieve it there ought not to be prolonged worry.."[†] "Skilled industry of the hands makes the brain more orderly in action. The child taught to use the hands skillfully is more apt to become an industrious citizen, and the habit of industry is the basis of orderly life."[‡]

Of causes directly affecting mental health, in addition to those already mentioned, among the working classes, there is worry from small wages, and intensity of anxiety night and day, causing sleeplessness; this also extends to all classes of women, the married from never having any sum or purse of her own, and consequently the utter misery that cannot be conveyed to the comprehension of the other sex; the ingenuity to make ends meet, the contrivances to avoid asking, especially when the need of economy is pressing upon them, even when the husband is generous and kind, all these, where the strain has been long-continued, the same set of ideas maintained in exhausting recurrence, the same part of the brain is kept continuously at work and a weakness results which may end in insanity.

It is said that insanity is on the increase, especially among the ignorant classes, and that only ten per cent. are cured. If this be correct, it is necessary that its causes should be searched for, and something done for its prevention. It is not an exclusively nervous disease, but

* Address of Dr. J. T. Arlidge, before the British Medical Association, 1878.

† "Insanity and its Prevention," D. H. Tuke.

‡ Mary G. Waro.

may and does originate in deterioration of the body through intemperance, dissipation in all its forms, over-work, mental and physical, meagre fare, lack of ventilation and neglect of moral culture. All these factors apply to both sexes, but bear more severely upon women, who have, in addition to their greater nervous susceptibility, the care and anxiety of children, menstrual irregularities, miscarriages and the consequent diseases of the pelvic organs. Absence of rational employment of the mental powers leads to indulgence in vices, drinking, &c., especially favorable to insanity in addition to the inheritance from parents who indulged in like habits, for "by free indulgence in stimulants and in tobacco, the parents debilitate their own constitutions, and transmit feeble ones to their children."* A superintendent of one of our New England hospitals for the insane has said that, "the dissemination of more correct views of the true way of living and a more rigid observance of the laws of health and nature, would greatly diminish insanity." The Commissioners in Lunacy in Scotland in a recent report said, "that insanity is to a large extent a preventable malady, that it is always attended with some bodily defect or disorder of which it may be regarded as one of the expressions or symptoms; preventable diseases will be diminished in amount when education is so conducted as to render the people both intelligent and dutiful guardians of their own physical, intellectual and moral health." "A study of the relation between modern life and insanity, shows that it is of a many-sided and complex character, that a large amount is preventable, that beer and gin, mal-nutrition, a dreary monotony of toil, muscular exhaustion, domestic distress, misery, poverty and anxiety, account largely, not only for the number of the poor who become insane in adult life, but who from hereditary predisposition are born weak-minded or actually idiotic."† "Insanity in women rarely takes place without the concurrence of both physical and moral causes."‡ Physicians have known for a long time that much insanity results from ignorance of the laws of life and health, or a disregard of them, and that it might be prevented by an avoidance of such habits as exhaust nervous power, but the community in general do not know this, and should be instructed. It is also well known to physicians that there are abnormal mental changes in women suffering from various diseases peculiar to their sex; and chief among the causes of these should be placed, forced abortions.

*Tuke.

†Tuke.

‡"Insanity in Women." Dr. H. R. Storer.

To the increase of this evil, attention was called by Dr. D. H. Storer, in 1855, then Professor of Obstetrics at Harvard, in his public address introductory to the annual lectures. In 1857, the American Medical Association appointed a committee to report upon criminal abortion with a view to its general suppression, with Dr. H. R. Storer as its chairman; and in the volume of its Transactions for 1859, will be found a series of resolutions by which the Association present the subject to the attention of the several legislative bodies of the Union, desiring that the laws on this subject may be revised. In 1860, Dr. H. R. Storer, published a volume entitled "Criminal Abortion in America," in which he set forth the evils resulting, its increase in this country more than abroad, and the weakness of the laws in those States in which any existed. At that time Rhode Island had no statute, and here, as in some other States, in the absence of special statute, the crime could only be reached at common law, and this only if the death of the woman occurred; no thought being taken for the death of the child, or of the ill health of the woman for the remainder of her life. Thus, in States where a definite statute does exist, it is practically useless and is often avoided, because legislators and the public fail to recognize the true character of the crime. As, for instance, here in Rhode Island, the statute passed in 1872 takes no cognizance of the murder of the child, and if the mother die in consequence of the drugs given or local injuries done to her, the penalty is imprisonment for a term varying from five to twenty years. "How inconsistent to punish murder, attempted or committed, if by injury to the throat or heart, capitally, and if by injury to the womb, by temporary imprisonment; especially where this latter case always necessitates the slaughter of a second human victim."* The Rhode Island statute says: "or shall aid, assist or counsel any person so intending to procure a miscarriage," shall incur the same penalties. Could not these words be carried forcibly into every household? Not a day passes but they would apply to some one. The ignorance as regards the guilt and the low morale of the community on this subject, are so perfectly appalling that the boasting of repeated and successful accomplishment passes unreprieved; and the press, such a power in the land, that if it chose, it alone could almost annihilate the crime, apparently openly encourages it, by the advertisements of quack doctors, of medicines and even of so called private hospitals, where the secrets of the victims may be buried with their mortal remains. In 1866, Dr. Storer wrote an essay entitled "Why Not?" to which the American Medical Asso-

* "Criminal Abortion in America." Storer.

ciation awarded a prize with an order for its general circulation. This book should be read by every woman and man. Aside from all which a law, however wise or however strictly enforced could reach, are the cases which occur in private, cases known only to the woman herself, through ignorance of the laws of life and health, ignorance of her own anatomy, of her duties to herself, her child, the community and to her Maker.

An erroneous idea prevails, that in the early months of pregnancy, there is no sin, and little danger to the woman's life. This is the very reverse of the truth; for the earlier in pregnancy its occurrence, as a general rule, the greater is the danger to life or to subsequent health, the greater the physical shock, the liability to hemorrhage, the liability to subsequent uterine disease, even to the much dreaded cancer, the active symptoms of which may be delayed until the climacteric,—the liability to repetition from habit or the production of sterility, bringing often disappointment when afterward children are desired. Those who do not look deeply into these causes and effects, say that women are less fruitful now than formerly, and wonder why it is so? The answer is, because they will not let themselves be so. But women are not alone to be blamed for this crying sin of the day; they have also to bear a mental suffering from the discontent of the father, far more acute than that from the fear of, or care for the personal pain and discomfort, often amounting to the temporary insanity of despair, and, therefore, driven as it were, to abortion as the only relief, and often encouraged thereto. Interference with the laws of nature is always productive of disease, and this sin is confined to no class of persons; it prevails among the married and educated, even more than among the ignorant, the poor, the unmarried. The latter might be supposed to have an excuse, if an excuse for a crime could ever be offered. The same argument applies here as was used by Dr. Gerrish,* in speaking of the social evil, "the chief of these causes is ignorance, * * * that while a lack of ordinary information and learning is conducive to depravity, it is ignorance of the laws of our being which is chiefly responsible for the mischief; that the proper and competent teaching of physiology and hygiene to the young would result in such improvement of morals that, in time, prostitution would largely disappear for want of support and patronage. The limited number of occupations to which women are admitted, their less pay than men for equal work, the obstacles thrown in the way of their learning those kinds of business most desirable for them—these stand as deep and shameful blots on our social

* Prof. Mat. Med. Bowdoin. Address before Maine Med. Ass'n, Oct. 1878.

system. As the first step in the right direction, we should have the study of human physiology and hygiene taught in our schools." To this public instruction of physiology, objection has been made that it should be left to the private judgment or tact of individual parents, and to this I reply that, it cannot be so left, for the parents themselves are too ignorant, as I have seen in several instances, and also the terrible results of such ignorance, but the parents should be able to teach their children early in life, the wisdom of subjugating appetites to morality and to cultivate a regard for the rights of others.

That so many women should have no definite occupation throughout the best years of their lives, no aim or purpose, their faculties and talents unexercised or lost, are evils which are fruitful causes of unhappiness and ill health, the effect of which is to be seen in society and is not felt by women alone. "Statistics show that the evil diminishes as means of employment are open to women, and in those cities where most employments are open to them, the lowest proportion of those who lead an abandoned life is found. Every endeavor which is made to open new fields of labor to women is a direct blow at this social evil."* The moral elevation of women of the lower classes implies and involves that of the men also; they must rise or fall together. Girls should be taught useful industry and skilled handiwork to save them from ill health, sin and crime; to prevent them from becoming a burden to themselves, their parents, husbands, and at last upon the charities of the community and the State. Another cause of this social evil is strong drink, in both sexes—stimulants appear to be necessary to keep up the strength for the life of excitement. The prohibitory law of Maine closed many houses of prostitution—this should give a clew to the management of this evil. They could not keep up this life under that law, and therefore many were driven from the State, and for some years past, in my efforts to work among them, I had observed, before I found the cause, that many came from Maine.

As to the causes of the diseases peculiar to women, the immediate and direct are to be sought in each case, the predisposing causes which are avoidable and are incurred chiefly from ignorance and a disregard of the laws of health are thus enumerated by one of the latest authorities : †

"Neglect of out door exercise,

"Excessive development of the nervous system,

* Paper read before the Association for the Advancement of Women, 1874, by Ellen Mitchell. Chicago.

† Dr. T. G. Thomas, of N. Y.

- "Improprieties of dress,
- "Imprudence during menstruation,
- "Imprudence after parturition,
- "Prevention of conception,
- "Induction of abortion,
- "Marriage with existing uterine disease."

To these might be added, Marriage with existing disease in the other sex. This list serves as a recapitulation of the chief topics of this paper. "No one will doubt the conclusion, that if in cold weather the feet, legs and abdomen of civilized women were clad in some woollen material; if they understood the necessity of caution during the period of menstruation and after labor; if they allowed the uterus to hold its proper place in the pelvis, uninterfered with by pressure; if they kept the sanguineous and nervous systems in their normal state of vigor by exercise, fresh air and plenty of good food, and at the same time avoided any habits which directly produce disease by injuring the genital organs, (including the breasts) much, very much less of uterine and kindred disorders would be seen by the physician. All these reforms would probably bring forth results in one generation, but it would require many generations of reformers to restore woman to her proper physical sphere."* Before much result can be obtained in the physical improvement of women, a change of tone in public opinion is needed. Delicacy must not be confounded with refinement, or thinness and paleness admired for beauty, rather than a comely shape well rounded by the full development of muscle and a due proportion of fat. Sickness should be considered as allied to sin,—the sin of breaking the divine laws of nature; a person should be as much ashamed of avoidable sickness as of falsehood and stealing. When women can be made to appreciate these things and to believe that whatever interferes with the full and proper exercise of any function, is likely to produce irregularity in its performance and finally organic disease, then will they cease to be invalids and sufferers. "If we compare the present state of women in refined society over the world, with that of the working peasants of the same latitudes, or with the North American squaws, or the powerful negresses of the southern States, we can with difficulty believe that they all sprung from the same parent stem, and originally possessed the same physical capacities. Observation proves that women who are not exposed to depreciating influences can compete in strength and endurance with the men

* Thomas.

of their races, and in savage countries they are sometimes regarded as superior to them."*

Knowledge of the causes of disease ought to help in the prevention, but does it? And why does it not, but because ignorance and selfishness rule both men and women, and women have in the past, been taught that they must do nothing to help themselves. Now that they have begun to realize that the regeneration of the world must come through them, they are aroused to form various clubs and associations for study and for practical efforts in all questions affecting the moral and physical condition of women, the effects of which will be seen clearly in the next generation.

I have here expressed my belief that *ignorance* is the first chief cause, at the foundation of all causes, and that therefore the responsibility should be taken up earnestly by those who have charge of public education and public health. It also concerns legislators who have to deal with questions of laws for crimes, to which ill health leads in either sex, to look more deeply into the preventable causes. My work will not have been ill done if any word herein shall elicit food for thought and action by and for women, for the improvement of the physical condition of the race.

A. E. TYNG.

* Thomas.

WHAT IS THE DIETETIC VALUE
OF
WINE, BEER, AND OTHER ALCOHOLIC BEVERAGES?

BY
L. F. C. GARVIN, M. D.,
OF LINCOLN.

Substantially as read before the Rhode Island Medical Society,
in December, 1870.

BEER, WINE, ETC., AS TABLE DRINKS.

The following article is not designed to treat of drunkenness, which, whether habitual or occasional, receives, even in this skeptical age, universal condemnation.

Nor does it aim to deal extendedly with ordinary dram drinking, in which at least two wineglassfuls of ardent spirits, five of sherry or port wine, or a pint and a half of strong beer or ale, are imbibed in the course of a day. Inasmuch as those who follow drinking to this extent are able usually to attend regularly to business, and are never seen "the worse for liquor," it is quite likely that persons may be found among the ill-informed, especially if their judgments are biased by personal indulgence, who defend the practice. Concerning this phase of drinking it need only be said that nearly all scientists, writers, and physicians, who by experiment or observation have qualified themselves to express an opinion, unite in pronouncing it unqualifiedly hurtful. Every medical practitioner is aware that the men who compose this great class, not bearing acute diseases well, swell the mortality of fevers and inflammations to undue proportions; he knows, too, how these persons, whose blood is scarcely ever free from alcohol, become the victims of chronic disorders, which long afflict them with gnawing and growing discomforts, succeeded by months or years of the most intense suffering, and, finally, bring life to a close when it should be in the prime.

To portray the effect upon the individual of so-called moderate drinking would require more time and space than has been allotted me. The best popular treatise upon the subject with which I am acquainted, and one well deserving a place in the education of our children, is by Dr. B. W. Richardson, entitled, "The Temperance Lesson Book."

My task, here, is to consider the question—upon which medical and scientific opinion is still divided—whether alcohol, when taken in the most unexceptionable manner, is serviceable in the maintenance of health. In other words,

IS ALCOHOL FOOD?

In defining the term food, we pass over the technical definitions which abound, and present one wholly practical. Food may properly be vended in the open market; whilst potent drugs should be dispensed by a competent apothecary under the direction of an educated physician.

It is scarcely necessary to show that alcohol is not a *necessary* article of diet. It is not present in the ovum, the sole nutriment of the embryonic state; nor in milk, the only support of infancy. It cannot be found in the animal or vegetable productions, pointed out by nature as the sustenance of adult life.

The elements of all these natural aliments correspond almost precisely with the proximate principles of the blood and tissues. Thus, in milk, a sample of the essential foods, exists water, chloride of sodium and potassium; phosphates of soda, potassa, magnesia and lime; iron; saccharine, oleaginous, and nitrogenous compounds, but no alcohol.

Following the lead of Liebig, many physiologists class alcohol with the hydrocarbons. His theory, that starch, sugar, oil and alcohol, act as “respiratory food,” has been overthrown; but, since it is certain that the three former articles do have some use in the system, a like value is ascribed to the latter.

The argument is, that alcohol and sugar, for instance, are nearly allied, because chemically they are composed of hydrogen and carbon, and by the simple process of fermentation, the one is derived from the other—only the volatile son of a sweet mother! Why, then, it is asked, may not both subserve the same ends in the system?

The resemblance is apparent rather than real. Glucose, by giving off carbonic acid and water, becomes wine alcohol, an easy transformation, it is true, but a step towards destruction. The process is precisely analagous to the decomposition of animal tissue. The carrion in the field bears the same relation to beef in the market that alcohol does to sugar. Yet while the one tempts the appetite in the form of Porter house steak; the other, introduced into the blood, gives rise to most fatal disease. Lineal descendants do not always reflect credit upon

their progenitors, as may be witnessed elsewhere than in the above examples of putrefaction.

Compare, likewise, their physiological action. Sugar is digested in the intestine, and thence slowly absorbed; alcohol passes immediately from the stomach into the veins. The one never reaches the arterial circulation; the other is found for hours afterwards wherever the blood courses, most and longest in the brain, the abode of manhood. The one, never in health, appears in the excretions; the elimination of the other at once begins by lungs, kidneys, bowels and skin. The one, taken in large quantity, satiates; against the other, the system never rebels, till it has paralyzed the power of deglutition. The one, in excess, merely disorders the alimentary canal; the other, by dethroning the reason, transforms man into a brute.

Certain recent writers have evidently perceived the difficulty of including alcohol among the hydrocarbons. Anstie, who has treated the question most extensively, creates a special class of foods, including alcohol, tea, coffee, cocoa, tobacco, &c. Without attempting to explain their *modus operandi*, he claims that they are capable of "averting death from inanition," and are therefore true aliments. If he stopped with this definition and classification, it might be granted. Theoretically, it is true that these articles, as well as the rest of his list, viz.: Chloroform, the Ethers, Strychnia, Morphia, Hyoscyamia, Atropia, Datura, &c., &c., are, under certain circumstances, maintainers of life.

Alcohol, without doubt, is no less a food than Strychnia or Atropia. But while he fails to recommend the trusting of the above deadly poisons to self-prescription by the people, he does, illogically, as it seems, assign a place to alcohol in ordinary diet. Not to dwell upon the inconsistency, we would consider the various arguments which he presents in favor of its use at the table.

First, alcoholic liquids are said to promote digestion. The action in the stomach is to coagulate any albumen present, and by local stimulation to cause a redness of the mucous membrane, and to increase the flow of gastric juice.

That is true. Is it desirable? Certainly, if one's digestion is perfect, any adventitious aid is superfluous, and had better be held in reserve for a time of need.

But suppose a man begins to realize that he has a stomach, and perceives, occasionally, after dinner, water brash, or a heaviness at the epigastrium, is it a matter of course that a "little wine for the stomach's sake" is demanded? A philosopher would seek the cause;

he might omit this piece of pie, or that dish of sauce, practice more thorough mastication, or accord a longer period of rest after eating. In a word, he would strike at the root of the disordered function.

Usually, in incipient dyspepsia, the removal of the cause is all that is required. But suppose a case be found in which the organ has not the power to prepare the requisite amount of food for assimilation, it does not follow that alcohol is the only or the best remedy. Perhaps it is bismuth, or strychnia, or pepsine, or gentian, or rhubarb that is indicated. These are the very cases which require the judgment of an educated physician. They are removed from the bounds of ordinary health; have become disease.

Again, says Anstie, alcohol is intended for those "ailments which are engendered of the necessary every day evils of civilized life."

Where one preaches that doctrine, thousands practice it. After the manner of a cigar, it produces a feeling of general comfort. Little aches disappear. The roughnesses of the journey of life are smoothed out. A physician, if kept awake all night by professional duty, is to make up the loss in the morning, as far as may be, by a few drachms of brandy. If the approach of an important operation produces in the surgeon a disagreeable feeling of trepidation, he is to steady his heart and nerves by an ounce of whiskey. If the hour of sleep finds him tossing on his bed with anxiety, a glass of wine will invite "nature's sweet restorer." If tired, or cold, or aching, or sleepy, or wakeful, or if in any way the nerves recoil under abuse, drink. Nay, more, since every day has its trials, it is well to accompany each meal with a glass of sherry or champagne, that duty may be made easy in advance. Such, we understand, is the argument in favor of alcohol, as a nervous stimulant in ordinary health. One might suppose that the moderate drinker would be free from all discomfort, superior to every infirmity of the flesh.

Theories are always beautiful until reduced to practice. They may be so perfect as to be irrefutable, except by the logic of experience. We will not, therefore, attempt an elaborate rejoinder to this one, but leave it to the observation of any rational man, whether a panacea has yet been discovered for all the ills to which "humanity is heir."

The power of alcohol to defer inanition, is made use of to prove its value as an article of diet. That it possesses this property is indisputable. Physiological chemistry has substantiated nothing more certainly than that small as well as large doses of alcohol diminish tissue change. Every product of the destructive metamorphosis of the system is decreased in amount by the ingestion of any alcoholic prepara-

tion. Less carbonic acid is thrown off by the lungs, less solid matter in the fæces, less urea, uric acid, and phosphates by the kidneys; the temperature of the body, that most accurate measure of vital activity, is reduced. Such prevention of waste necessarily postpones starvation. In shipwreck, a cask of brandy would doubtless protract life longer than the same quantity of water.

But how many in this country are unable to get enough to eat? The greater danger is of gormandizing. In those persons who have enough wholesome food, it is undesirable to lessen the moulting of the organism. Tissue change is a measure of vitality; vitality is a token of health. In a state of debility, the solid excreta of the system are diminished. In sleep, the temperature is half a degree lower than when awake. Is it, then, advisable to imbibe that which reduces the physical condition of daily life to the level of invalidism or torpidity?

On the other hand, the solid excreta of the robust and active man is greater than in the sedentary. Exercise or digestion raises the temperature, and augments the excretion of carbonic acid.

Here, then, an agent is recommended which prevents, to a greater or less degree, the normal manifestations of exalted animal life.

Water, on the contrary, like a true handmaid of nature, promotes the healthy metamorphosis of tissue—prevents, as it were, the clogging of the wheels within the complex machinery of the human body.

Whilst admitting that “alcohol adds no increment to the bulk of the tissues,” Anstie yet relates numerous cases, occurring in the practice of various English physicians, to prove that life has been maintained for a long period chiefly, or even wholly, upon spirituous beverages.

Not one of the very remarkable instances is perfectly substantiated; but he thinks there must be some truth in so much evidence. Perhaps the most wonderful example was a patient of Dr. Inman: “She was about twenty-five years of age, handsome, florid and embonpoint; of very active habits, yet withal of a delicate constitution.” “This lady had two large and healthy children in succession, whom she successfully nursed. On each occasion she became much exhausted, the appetite wholly failed, and she was compelled to live solely on bitter ale and brandy and water. On this regimen she kept up her good looks, her activity, and her nursing, and went on in this way for about twelve months.”

It is evident, as these physicians claim, that the moderate checking of destructive metamorphosis effected by alcohol, would not suffice to explain cases like this. It must be a direct nutriment. Indeed, if

these be facts, it is far superior, as a food, to all the hydrocarbons. Lehman undertook to live exclusively upon a diet of starch, sugar and oil. He became, in consequence, so ill, that at the end of three days he abandoned the experiment. Hammond made himself absolutely sick by ten days dieting upon starch and water. Such a result is not surprising, when we consider that five ounces of nitrogenous matter are excreted daily, and that consequently, at least a like quantity must be ingested, if the tissues remain intact. A non-nitrogenous diet, like alcohol or starch, by *a priori* reasoning, would be insufficient to maintain life. But if there is a substratum of truth in these extraordinary cases, and unless they be the kind of exceptions that do but prove the rule, it is an easy matter to put them to the test. Let Doctor Inman institute an experiment as to how long he himself can live solely upon alcoholic beverages. Only such proof will be convincing, for we are assured that the patients, whose cases they report, if put under strict surveillance, like the hysterical girl recently starved in England, would either eat or die.

As a proof that the special class now under consideration is alimentary, it is stated that there exists for it in man a natural appetite. That although there are individuals who abstain entirely from every form of stimulant, yet throughout the globe there is a general use of alcohol, opium, tea, coffee, tobacco, hasheesh, cocoa, or arsenic. The fact is acknowledged, but this is not the age to assert that all natural tendencies of imperfect humanity are right. On the contrary, the use of these stimulants is no more extensive than depravity. It is the mission of religion and civilization to do away with all manifestations of selfishness, whether of the appetite and passions, or of the heart.

In closing the consideration of alcohol, as belonging to a special class of accessory food, it is well to consider to what an acceptance of this theory logically leads. So far as we can distinguish, every argument in its favor applies to opium as well as to alcohol. If the one is of important dietary value, so is the other. Yet, to judge from the stringent legal regulation of the sale of opiates, and from the care of physicians in their administration, few hold the opinion that the seductive extract of poppy should be thrown open to general use.

■ The latest work on this theme is by Dr. Calkins, of New York, entitled "Opium, and the Opium Appetite." It probably embodies the opinion of the majority of the profession.

As a collection of facts, it certainly is worthy of all praise. The author arrives at the conclusion that opium eating is worse for men, but rather better for women, than drunkenness. He fears that the

practical effect of the disuse of alcoholic beverages will be to introduce as a substitute the more portable and degrading inebriant, morphia. He bewails the fanaticism that advocates total abstinence from alcohol, but of opium, he says, as a "deduction," in the last chapter of his book "Against the temptation to habitual use, neither individual constitution, nor social condition, provides any certain immunity." "In a practical view, it may be affirmed of the habit, that the same is virtually non-vincible." "Dosing, by gradual augmentations, is the normal course of experience."

These are words that apply to alcohol as well as to opium. If they be true, the cry of total abstinence cannot be pronounced absurd, until experience has shown that such a course is deteriorating to bodily health.

Thus far we have endeavored to show that there is insufficient reason to class alcohol with any sort of food. Now, there remains to be considered, its relation to drugs. In this it is not necessary to select the gentler agents of the *materia medica*, whose action is silent, and whose power for good or evil is scarcely determined. On the contrary, alcoholic liquids will bear comparison with the most potent medicines of pharmacy, such as prussic acid, belladonna and chloroform. Powerful neurotics usually enter the blood directly from the stomach, exert each its peculiar action upon the system, exercising, in an unexplained manner, an especial influence upon the nerves, and then pass out through the emunctories, leaving the body once more subject to normal agencies. Like German invaders on French soil, they bring new customs, overthrow the established order of things for a season, and then depart, leaving temporary disturbance behind, with perhaps an ultimate beneficial result. Now, it cannot be said that the whole of a dose of alcohol, or certain other nervines have been detected in the excretions. But it is true that the physiological action is temporary, and that at the end of a short time (not usually more than forty-eight hours) no trace of them can be discovered in the body. If the doses, however small, are so frequently repeated, that the blood is never free from their presence, an abnormal change is effected in the molecular constitution, either of the nerves or vital organs; also, in excessive doses they produce death. These are attributes which, as no words are required to show, belong to alcohol.

Without pursuing a general comparison further, let us observe more closely the resemblance of alcohol to a single admitted drug.

Ether might well be named Rapid Alcohol. The relationship in this case is genuine. The formula for ether is C. 4, H. 5 O.; for

alcohol C. 4, H. 5 O., H. O. The one is oxyd of ethyle, the other hydrated oxyd of ethyle. The former is obtained from the latter, simply by the subtraction of one equivalent of water. Both are volatile, mobile liquids, of a penetrating odor, both combustible, readily evaporating, quite universally solvent. Their boiling points are low, viz: 95° and 172° F. Neither can be frozen by a temperature of 166° below zero. Both produce their effects when inhaled, as well as when administered internally. Of each, the primary action is stimulant, the secondary, anæsthetic. From the first introduction of etherization, Dr. Bigelow and others have remarked how precisely its different stages correspond to those of alcoholic intoxication. It is the same thing condensed into a shorter time; yet we have never heard it advanced that ether is an article of diet, and should be placed in the hands of the people for indiscriminate use.

Of the many who urge the value of alcohol, as a stimulant in health, we know not one who approves it as a narcotic. Anstie believes that its use in disease, even, should be limited to small doses, and that if the desired effect is not thus obtained, its administration is contra-indicated. Whilst unable to prove that small and large doses differ only in degree, we do assert that their action is not so directly opposite as has been described; but that on the contrary they are strikingly analogous. We know not that the experiments of Dr. Edward Smith have been disproved, from which he concluded that a minute quantity of spirits impairs the perceptive power of the special senses.

The first indications of narcosis, are flushing of the face, moisture of brow, or cerebral excitement, caused by paralysis of sympathetic or cerebral nerves.

But before any of these symptoms appear, a so called proper dose, it is said, produces a sense of warmth, at the epigastrium, and of universal comfort, allays hunger, relieves pain and wakefulness, checks excretion, and, unlike an intoxicating quantity, increases the force and rapidity of the heart's action, necessitates no reaction, calls for no subsequent increase.

It is well known that the first six in the above classification of effects, viz.: the causation of local and general comfort, the lessening of appetite, pain, insomnia, and excretions, are brought about, not only to an equal, but to a *greater* extent by large than small doses. It is a fact illustrated by every drunken spree.

As to the augmentation of the heart's activity, being evidence that stimulant and narcotic doses of neurotics are radically diverse, look at Anstie's own experiments. One drachm of ether raised his pulse from

74 to 88, whilst two and a half drachms (an intoxicating dose for him) carried it to 104 beats per minute. Indeed, all have witnessed in the production of anæsthesia, that pulsation is most rapid during the period of greatest excitement, when consciousness is nearly extinct.

Great stress is laid upon the idea that no reaction whatever follows the use of a mere stimulant. Certainly the recoil from a single glass of wine is seldom disagreeable. That it always, however, exists, we may infer from the fact of its severity in certain cases of idiosyncrasy, and because even the normal stimulation of a meal, or bath, is succeeded by moderate depression.

Lastly, it is asserted, that a purely stimulant use of any of this class, does not deprave the appetite, or lead to increase, either in the quantity or strength of the beverage.

This is another assumption, concerning which we appeal to experience for refutation.

I once advised a man subject to extreme cardiac pain to cease the use of tobacco. He was a habitual, but moderate user, rolling it as a sweet morsel under the tongue, rather than chewing it. The effect was merely a feeling of comfort. He gave it up for two weeks, substituting bark, liquorice, &c., in order that the mouth might feel its accustomed tenant. But the system could not be thus cheated. He was obliged to leave off work as a painter. The tremor of hand and disorder of mind completely unnerved him, nor could the brush be resumed till he had gone back to the tyrannical weed,—as much a victim of slavery as any treated of in “Uncle Tom’s Cabin.”

We are all familiar with the effect of opiates upon children under the guise of Mrs. Winslow’s Soothing Syrup, and other similar preparations. The result is an increase of dose from month to month, and continuous worrying when not under its influence.

It is to be observed, likewise, that those foreigners, resident in our country, who laud the sprightliness and temperance of Europeans, are themselves in love with the wine cup. They import largely for personal use, and feel lost without their habitual stimulus.

It is probable, as has been before stated, that a man can survive upon a less than average amount of food by the help of some of this liquid tissue preserver. But that moderate drinkers in our country take less food than abstainers, we would fain deny. Ales, wines, and whiskey are prescribed for want of appetite. Is it thought to increase the desire for food, and still have the patient eat less?

Those who "linger long at the table" are wine bibbers. It is this adventitious aid which enables them to digest five or six courses of richly served viands.

While bathing at Newport last summer, during the hour allotted to men, an opportunity was afforded for studying the anatomy of some of our moneyed aristocracy. We were surprised to see their stomachs so much larger than their heads. It suggested, in spite of our reverence for America's prominent men, porkers fattened for the market. While achieving their prosperity, they doubtless were not afflicted with hypertrophy of the stomach.

Finally, it is unfortunate for the theory that small doses are wholly beneficial, and large ones utterly detrimental, that Anstie's extraordinary instance of life, maintained by alcohol, with scarcely an exception, occur in downright toppers. The young woman, for example, whose case has been related, was several times on the verge of delirium tremens.

The facts collated in this paper indicate the true use of alcohol. It is a preservative of the tissues, not by supplying what they need, but by checking their waste. Its application, then, is to that emergency, when, from any cause, destruction is in excess of construction. Hence, its value in low forms of fever, when, as indicated by the high temperature and crowded emunctories, disorganization is taking place with dangerous rapidity: also, in those chronic affections in which emaciation is the prominent symptom. Finally, in those special cases, where even the most concentrated forms of food are rejected by the stomach, brandy may be retained, and temporarily suffice. When given under these circumstances, not an atom would we subtract from its fair fame.

Physicians, themselves, when requiring treatment, seek the advice of a brother practitioner. They know that a sick man, however skillful, is unable to judge correctly of his own case. But alcoholic liquors, classed among the most potent drugs of the *materia medica*, every man, however ignorant, may prescribe for himself. Is it strange that such self-made doctors often kill their patients?

The persons who enter upon the use of stimulants are not those who are afflicted with dyspepsia, whose circulation is sluggish, and who seem to require an extraneous aid to keep even with the duties of daily life. The habit is begun in the vigor of youth, when vitality is superabundant, when mince pie, cheese, and doughnuts can be eaten at bed-time with impunity, when ambition is exuberant, and hope is buoyant. At a period when judgment and experience alone are unde-

veloped, the young man is tempted on every hand to stimulate. The consequences may be read in the poverty and crime of Rhode Island.

We have shown that alcohol is not one of the essential foods; by comparison, that there is little physical or physiological resemblance between it and the hydro-carbon foods; whilst the relation between it and anæsthetic drugs is extremely intimate. That, as a member of a special class of aliments, it is only nutritious in the same sense as opium and arsenic. In fine, theoretically, there is reason why it should be subject to the same restrictions as other potent drugs. Is it not likewise true practically? If the beverages presented for public sale contained but two or three per cent. of alcohol, philanthropy might reserve its forces for greater evils. But the best wines in American market contain from twelve to twenty per cent. of alcohol, and the least hurtful adulteration to be hoped for is the increase of that proportion. Indeed, so soulless are the men who engage in this traffic, that no poison is too dangerous for them to make ready for the stomachs of their fellow men.

In consideration of the scientific facts known to the profession, and the daily effects known to all men, we believe it both a right and a duty to stop the sale of stimulating beverages by irresponsible persons, and to confine them to their proper place in the drug store.

THE CAUSATION OF TYPHOID FEVER.

BY

GEORGE E. WARING, JR.,

OF NEWPORT, R. I.,

The Trustees of the Fiske Fund, at the annual meeting of the Rhode Island Medical Society, held in Providence, June 12, 1878, announced that they had awarded a premium of two hundred dollars for the best dissertation on The Causation of Typhoid Fever to an essay bearing the motto, "*Qui n'a santé n'a rien*," and on breaking the seal of the accompanying packet they found the author to be George E. Waring, Jr., of Newport, R. I.

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THE CAUSATION OF TYPHOID FEVER.

The long-continued and somewhat thorough investigations of the ultimate methods of the causation of this disease have failed of a scientifically accurate result. The question whether typhoid fever always springs from the presence of specific poison produced by a parent case of the disease, or whether it may, under certain circumstances, arise *de novo*, is still in doubt. It is hardly worth while, in a paper prepared for the use of medical practitioners, to restate the facts and observations which support one or the other of these theories; this would lead only to the inconclusive result which has always thus far attended the discussion.

By far the majority seem to sustain the opinion of Dr. Budd and his followers, that the disease can originate only from the presence of a specific poison produced by a previously existing case. It should be remembered, however, that as most physiological investigators have confined their observations to dense communities, where the disease has prevailed, their observations are more or less clouded by the probability that previous cases have had an influence upon those under consideration.

Although their number is far smaller, other investigators have devoted themselves entirely to very sparsely settled districts, whose isolated families have so little communication with the rest of the world and with each other, that it is easy to determine the exact circumstances of contact. The occurrence of typhoid fever in a house standing miles away from all others, where it is rare that any member of the family goes from home, and where a visitor as rarely comes, furnishes strong presumptive evidence of the correctness of Dr. Murchison's theory of a possible *de novo* origin.

To show the testimony upon which opinions are based, we may cite the instances described in various reports of the Massachusetts State Board of Health. In that State the annual deaths from this disease are about one in one thousand, and it is estimated that one-tenth of the cases are fatal; so that about one per cent. of the population are attacked by the disease. There, as elsewhere, typhoid is peculiarly a disease of the country rather than of the town. The observations of ten years show that among a population of 1,044,294 persons, living in large towns, the typhoid death-rate was 0.755; and that among a population of 213,468 persons, living in small towns, the rate was 1.189.

The case is reported of a house in Hadley, built by a clergyman, where a well existed in the cellar into which foul air from the sink drain had access. Vegetables were kept in the cellar; the windows were never taken out; there was no escape for the foul, damp air; and water stood in drops upon the ceiling and walls.

"After a few months' residence in the house the minister's wife died, of fever, so far as I can learn. He soon married again, and within one year of the death of the first wife the second died, from, as I understand, the same disease. The children were also sick. He lived in the house about two years. The next occupant was a man named B—. His wife was desperately sick. A physician then took the house. He married, and his wife died of the fever. Another physician was the next tenant, and he, within a few months, came near dying of erysipelas. All this while matters had remained as before described with reference to ventilation. A school-teacher then rented the house, and tore up the closed box, but did not cover the well. This was about eight years after building the house. The sickness and fatality were so marked that the property became unsaleable. When last sold every sort of prediction was made with reference to the risks of occupancy, but, by a thorough attention to sanitary conditions, no such risks have been encountered."

The case of the Maplewood school, at Pittsfield, fully and thoroughly reported upon by Drs. Palmer, Ford, and Earle, is too well known to be detailed here. Of seventy-four resident pupils, sixty-six had illness of some sort; fifty-one had well-marked typhoid fever. Of the whole family of one hundred and twelve persons, fifty-six had typhoid fever, and sixteen of these died. The cellar was used for storing vegetables; the privy vault communicated with the main hall of the building; the kitchen drain discharged near by; the privy vaults were filled nearly to the surface; and, in the summer season, the house was pervaded by

foul odors. The school was dismissed; the sanitary condition of the establishment was thoroughly improved, and the institution became and has continued free from disease.

In a boy's school in Pittsfield the well stood under the wash-house, and was fouled by its leaking drain. Coinciding with this condition there was a serious outbreak of typhoid. The well being closed, and the water supply being taken from another source, the fever subsided. In another instance, men engaged in draining a meadow drank from a well supplied only from the water of the meadow, and were attacked under circumstances which seemed to connect the disease with the drinking of this water. In another an attack followed the drinking of water from a sluggish brook fouled by town sewage.

Evidence is given in these reports of outbreaks which were traceable to the tainting of an air-box, which supplied a furnace, by exhalation from the house drain; by the draining of a mill-pond which contained *no* sewage matters; and by the proximity of a stagnant ditch which had no obvious source of excrementitious fouling.

In Sutton an outbreak of typhoid coincided with the flow of barn-yard waste into a well three rods distant on the occasion of a sudden thaw.

The correspondent from the town of Oxford says: "So firm is my belief of this [referring to exhalations from foul drains, cellars, privies, and pig-sties] as a cause of typhoid fever, that when I meet with a case of typhoid fever, not readily traceable to some of these causes, I infer that the truth has not been told me, or that my perceptive faculties have been at fault."

At Martha's Vineyard and in Newton there seems to be evidence that the prevalence of typhoid is effected by geological conditions, clay subsoil or underlying rock covered with rich soil favoring the disease. The very local character of most epidemics indicates defects of soil rather than of air. A physician in Pittsfield reports four cases and one death occurring among charcoal burners occupying two houses standing high up on the mountain side, and supplied with pure spring water. The first case had been exposed to no other than local agencies. The house was built into the hill-side, and on its upper side there was a foul pool of house-slops standing several feet higher than the level of the floor. This seemed to have caused the first attack of the disease, which subsequently extended to the other house, there being frequent communication between the two. The outbreak took place in August, when the windows overlooking this foul water were probably kept open.

At Coltsville, slops were thrown out near the well, and a foul barn-yard pool stood near it. The condition of the well was the only traceable cause of the disease which followed. In another case the fever occurred after the use of water from a well near a barn-yard. Indeed, in all of the records of typhoid investigations, here and abroad, there appear innumerable instances where drinking-water wells were contaminated by infiltrations from manure heaps, swill, slops, cesspools, and privy vaults. In other cases, where there has been no conspicuous contamination of the drinking-water, outbreaks of the disease have coincided with the emptying of mill-ponds for the purpose of repairing the dams. Again, the infection of well-water by the infiltration of soap-suds in which the clothing of fever patients had been washed seems to have caused an outbreak.

One of the most striking examples of investigation of the ætiology of typhoid fever occurring in very sparsely settled districts is to be found in a paper by Dr. W. H. Bramblett, of Newberne, Va., published in the *Virginia Medical Monthly*, May, 1877, page 109. Dr. Bramblett practices along both sides of New River, which flows through a mountainous country broken into numerous valleys and gorges. There are no ponds or marshes whatever, and the elevation is from twenty-two hundred to twenty-five hundred feet above the sea. His investigations lead him to the belief that typhoid fever may originate without the least possible connection with a previous case. He cites seventeen cases, which had seven distinct starting-points, entirely unconnected with one another and with any other traceable source of contagium. The drinking-water seems to have been always pure, mountain-spring water; the privies appear to have been well placed with respect to the house; and, so far as can be gathered from Dr. Bramblett's report, there was an entire absence of all of the conditions which usually attend outbreaks of this disease. The description of symptoms indicates that the cases were all true typhoid fever. Among his conclusions Dr. Bramblett suggests the following: that "typhoid fever often originates spontaneously," or that "the contagium to which the disease owes its specific character originates *de novo*."

In estimating the value of this report it is to be considered that the reporter believes typhoid fever to be directly contagious,—a conclusion diametrically opposed to the recorded observations of those who have had experience in great fever hospitals.

While the voluminous records of investigation as to the origin of typhoid fever fail utterly to decide the question between those who do and those who do not believe that it can originate *de novo*, and while

they leave in doubt the question between "living germ" and "specific poison,"—while, in other words, they leave the purely scientific problem still unsolved,—they are full of instruction as to the causation of the disease as we almost uniformly know it in practice. From the point of view of the medical practitioner, although much is still to be learned, we already know enough for the complete stamping out of typhoid fever as an epidemic. Sporadic cases may still occur, but if the physician knows what he may now learn, if he is energetic in the performance of his duty, and if he is sustained by private opinion and by public authority, he may, in every instance, prevent the extension of the disease to a second subject. Practically, so far as the health of the public is concerned, we may be said to possess already very nearly all the knowledge that we need.

There is no longer any dispute concerning the chief vehicles by which the specific contagium of typhoid fever is conveyed. These are the air that we breathe and the liquids that we drink. Perhaps we may narrow the question still more, and ascribe to the action of the air only the indirect conveyance of the contagium to the stomach; for there are indications that as the contagium of typhoid fever proceeds from disorders of the alimentary canal, so it is only the surfaces of the alimentary canal which are susceptible to its attack.

The poison of the air may be direct or indirect. That is, it may be due to the exhalations of decomposing matters in dung-heaps, pig-sties, privy vaults, cellars, cess-pools, drains, and sewers; or it may be due (according to Pettenkofer) to the development of the poison deep in the ground, and its escape in an active condition in ground exhalations. The water, milk, etc., which we drink may be contaminated by the absorption of foul odors from air with which they are in contact, or by the direct admixture of organic matters bearing the elements of infection. There is such a multitude of possible sources and channels by which the infection may be brought to us that it is often almost impossible, in first cases, to determine which has been actually in operation; but the original case being established, it becomes comparatively easy to trace the channel of its influence in the production of further cases.

It is with these well-known and clearly traceable agencies of development and communication, by which the initial causation is favored and the extension of the disease insured, that the practicing physician and the health officer have chiefly to do. If it is true that prevention is better than cure, then it should be the first care of the physician to insure the absence of all conditions which do or may favor the origin and spread of the disease.

Typhoid fever has in this connection an especial importance, not only as being a wide-spread scourge of almost unequaled magnitude, but as being the typical "pythogenic" disease. Its development and extension are due to conditions which equally promote the spread of diphtheria, diarrhœa, dysentery, cerebro-spinal meningitis, scarlet fever, and the long list of minor ailments which, without destroying life, make living almost worthless,—diseases which undermine happiness, sap the springs of energy, and overwhelm the patient with listlessness and *ennui*. It is the best known and the most widely spread of the long list of preventable diseases; and as the circumstances which favor the extension and aggravate the character of the whole of these are those which have the strongest influence over itself, so by removing the conditions which foster them we shall do much to restrict its contagion.

All the learning of the ages has taught us no better formula to express a perfect sanitary environment than the old one of Hippocrates: "Pure air, pure water, and a pure soil."

If we would turn typhoid from our doors, and literally stamp it out as an epidemic, we need only to insure this condition in its integrity. We may still import single cases from less cleanly neighborhoods, but it will be our fault if we permit it to attack even one of our own community.

Turning now to the practical bearings of the question, we may safely assume that typhoid fever is not conveyed by simple personal contact with the diseased body. According to Dr. Murchison, in the London Fever Hospital, where two thousand five hundred and six cases of typhoid fever were treated in fourteen and one-half years, there occurred during the whole time only eight cases which originated in the hospital. Other instances are almost as striking, and in some cases the disease originated in isolated wards, such as small-pox wards, where personal contact was impossible, but where a conveyance of the infection by drains, air channels, etc., was clearly detected.

It may doubtless be assumed that the agency in the spreading of the disease from an original case exists entirely in the dejections from the bowels. Dr. Budd thinks that the surface of the bowels throws off the specific poison, as the surface of the skin throws off the poison of other diseases. The infecting material, whatever may be its character, is believed never to be active until it has undergone a certain development in connection with subsequent fermentation or decomposition of the dejections. Its vitality is very great, and seems little dependent upon circumstances other than the effect of a very high temperature. Dr. J. M. Lazzell, in the Transactions of the Medical Society of West

Virginia for 1877, publishes a paper on the contagiousness of typhoid fever, in which he describes an outbreak in the family of one Thomas, which in time produced such terror that no nurse or washer-woman could be induced to come to the house. The bed linen and clothing, soiled with typhoid dejections, were boxed up and packed away. Three months after the disease had disappeared from the country, and when the general health was good, a girl came from six miles distant to do the house-work. Among other things she washed this boxed-up clothing. In ten or twelve days she was taken sick, and went home. Dr. Lazzell was called to her five days later, and recognized the same form of typhoid fever that had occurred in the Thomas family. Eleven members of her household were exposed, and eight of them took the disease. It did not attack a single person not so exposed.

The evidence is copious and conclusive that typhoid infection is transmitted often to a long distance, and after the lapse of considerable time, by running water to which the dejections have obtained access.

In Wicken Bonant the stools of a typhoid patient were thrown into a vault which stood near to the edge of a brook thirty-five yards above the parish well. The water-course carried the infection to the well. Forty-five cases occurred: five of them among one hundred and eighteen persons who did not drink the water from the well, and the remaining forty among eighty-eight persons who had no other source of water supply. That is to say, of those who used the water from the parish well forty-six per cent. were attacked, and among those obtaining water from other sources less than three per cent. were attacked. This statement is taken from the twelfth report of the medical officer of the privy council of England.

I have previously cited the case of the outbreak at Over Darwen, in England, as follows:

“There has recently been an investigation into the origin of an outbreak of ‘filth fever’ in Over Darwen, England, the origin of which for a long time eluded the careful search of the authorities. It was finally worked out by a sanitary officer sent from London. The first case was an imported one, occurring in a house at a considerable distance from the town. The patient had contracted the disease, came home and died with it. On first inquiry it was stated that the town derived its water supply from a distance, and that the water was brought by covered channels, and could not possibly have been polluted by the excreta from this case. Further examination showed that the drain of the closet into which the excreta of this patient were passed emptied itself through channels used for the irrigation of a neighboring field.

The water-main of the town passed through this field, and, although special precautions had been taken to prevent any infiltration of sewage into the main, it was found that the concrete had sprung a leak and allowed the contents of the drain to be sucked freely into the water-pipe. The poison was regularly thrown down the drain, and as regularly passed into the water-main of the town. This outbreak had a ferocity that attracted universal attention; within a very short period two thousand and thirty-five people were attacked, and one hundred and four died."

Liebermeister says that typhoid dejections, conveyed in night-soil spread as manure upon the gathering ground of an aqueduct, so contaminated the water supply as to produce an epidemic of typhoid fever among the population using the water.

Similar instances might be cited almost without number. Indeed, there is among investigators no difference of opinion as to the communication of the disease by means of drinking-water thus polluted. There are many instances recorded of the contamination of the water of wells by the transmission of fecal matters through the soil from adjacent privy vaults and cess-pools. One of the most striking of these is that of an outbreak in the village of New Boston, in Erie County, N. Y., in 1843, investigated and reported upon by Dr. Austin Flint, Sr. From its early date this case is worthy of description here. No case of typhoid fever had ever been known in the county. The community numbered forty-three persons; twenty-eight of these were attacked with fever, and ten died. All of those affected obtained their drinking-water from a well adjoining the tavern; but one family, living in the midst of the infected neighborhood, owing to a feud with the tavern-keeper, did not drink this water, and escaped infection. Two families lived too far away to use this well. This immunity on the part of the enemy of the tavern-keeper led to a charge that he had maliciously poisoned the well,—a charge which resulted in a suit for slander and the payment of one hundred dollar damages. At that time the idea that typhoid fever might be communicated by infected drinking-water had not been advanced; but its truth receives strong confirmation from the fact that a passenger, coming from a town in Massachusetts, where typhoid prevailed, and traveling westward in a stage-coach, having been taken ill, was obliged to stop at this tavern. Twenty-eight days after his arrival he died of typhoid fever, and thus, doubtless, transmitted in some way to the water of this well the germs of the disease, which speedily attacked every family in the town except the three which did not resort to it for their supply.

Not only does water itself serve as the direct vehicle of contagion, but it has in several striking instances, caused the serious contamination of milk which had been directly diluted by it, or which had been stored or carried in vessels washed with it. The most noteworthy of the reported cases of this character is that of an outbreak in Marylebone and the adjoining parts of London, reported by Radcliffe in the second number of the new series of reports of the medical officer of the privy council. Two hundred and forty-four cases were distributed through one hundred and forty-three households. There was at that time no corresponding increase in neighboring districts, and the metropolis generally was unusually free from typhoid. The conclusions arrived at were the following: (1) the outbreak was caused by milk infected with enteric fever material; (2) this milk came from a particular farm; (3) the water used for dairy purposes on this farm contained excremental matters from a patient suffering from enteric fever immediately before and at the time of the outbreak. Of one hundred and ninety-one cases occurring in nine weeks, one hundred and sixty-seven were in households taking this milk, and only twenty-four in households not taking it.

All evidence points to the long vitality of the infecting material, which lies dormant at times for many months, and then, under favorable circumstances, acts with violence.

Not only does the infection follow the course of water to which it has gained access, or find its means of dissemination in the exhalations of decomposing filth, and thus contaminate the air which we breathe, but these exhalations are readily absorbed by water, which is capable of holding the poison, to the detriment of those who may drink it, and of transmitting it again to air with which it may be in contact. Many cases have been reported similar to that cited by Dr. Carpenter, health officer of Croydon, who traced the origin of an outbreak to the drinking of water from a house cistern, to which air from the public sewer had been led by the pipe serving as an overflow for the cistern.

Especial danger attaches to the use of water-traps, or water held in the bends of waste-pipes, soil-pipes, etc., when these are the only barrier between the interior of the house and a sewer or cess-pool containing typhoid dejections. The retained water absorbs the poison at its outer or sewer end, becomes saturated with it, and gives it off to the air in the house end of the pipe.

The conclusion from the foregoing is clearly this: that the dejections of typhoid patients are always to be regarded as dangerous material, capable of developing and spreading the fatal infection under a great

variety of conditions; that the only sure means for preventing the spread of the disease must be sought either in the speedy, complete, and distant removal of the material, or in its complete disinfection. If to be retained in the vicinity of human habitations, it must be disinfected, or subjected to decomposition, under such conditions that its poisonous material shall be destroyed; if to be removed, it must be removed to a point beyond the reach of the community, and to a point where it can in no wise contaminate the source from which drinking-water is taken.

The contagium of typhoid fever is not a poison in the sense in which strychnine and arsenic are poisons,—attacking alike each body into which it may be introduced,—but, like the contagium of other diseases of its class, it depends upon a certain condition of susceptibility on the part of the subject. This infection, like many others, is inoperative except upon a system prepared to receive it. In other words, we must have not only the seed but also the soil. In discussing the causation of this disease with the practical object of seeking the means for its prevention, we have to regard not only the source of the contagium, the vehicles of its transmission, and the method of its attack, but in almost equal degree those influences which tend to dispose the human body to succumb. This double condition (that there must be, if not absolutely always, at least very generally, an actual element of contagion, whether germ or specific poison, and also that there must be a state of susceptibility on the part of the subject) greatly improves our chances of success in contending with the disease. We know where the morbid material resides, and so are enabled to avert its approach; and, on the other hand, we know what conditions of living induce the susceptibility, and so have it in our hands, by improving these conditions, to increase the power of resistance.

So far as the prevention of typhoid fever is concerned, aside from tonic medication, the means to be employed are of a purely hygienic character; it is a question of the skill of the practitioner as a sanitarian rather than as a physician. He has two objects to attain; first, the removal of the infecting cause; second, the provision of healthful conditions of living. If the theory is correct that, as Dr. Murchison supposes, typhoid fever may originate *de novo* from the decomposition of organic matter, then the two objects are to a certain extent blended, in so far as atmospheric conditions, which might induce susceptibility, are also capable of causing the disease. In effect, our practice will be safely guided if we regard the two objects as separate and distinct.

Starting with the proposition that typhoid fever is produced only by

the operation of a specific cause borne in the dejections of typhoid patients; that it is innocuous when first voided, but becomes active after a certain exposure in the decomposing fæces; that it has great vitality; that it is capable of being carried by flowing water, by water percolating through the earth, and by the vapor of water floating in the air; that it may be absorbed and retained and exhaled by water; and that it may be retained, developed, and transported by clothing and other articles soiled by its medium, we see that the greatest possible vigilance and the most skillful care are to be applied to the treatment of typhoid dejections. Some of the experiences of England indicate the truth of the statement of the Rivers Pollution Commissioners, that so far as the cause of infection is concerned "filters do not filter and disinfectants do not disinfect." It will at least be safe to assume that in the case of water-carriage the immediate distant removal and the most complete atmospheric exposure are much more effective than any treatment of sewage by the usual methods of filtration; also, that any attempt at chemical disinfection must be more than ordinarily thorough. There is reason to suppose—reason almost sufficient to secure reliability—that the poisonous element is developed and made effective only when the decomposition of the fæces containing it takes place in the absence of a supply of fresh air sufficient to carry it on in the most rapid and healthy way. In other words, active oxidation, whether produced by oxidizing disinfectants, by the operation of atmospheric oxygen, or by the intensified oxidizing power of the contained gases of porous material, seems to prevent decomposing fæces from assuming a condition favorable to the development of infection. The evidence in support of this theory is of course of a negative character, but it is extensive, and, so far as the writer knows, it is accepted by leading physiologists.

Typhoid fever is not produced by exhalations from the surface of lands irrigated with the discharge of such sewers as have a rapid and continuous flow, and thereby deliver all they receive before it has had time to undergo decomposition. There is no evidence that typhoid fever is caused by the contained air of thoroughly ventilated soil-pipes. The most active professional enemies of the earth-closet system have never adduced an instance where typhoid fever, or any other cognate disease, has followed its well-regulated use. In *The Lancet* of March 6, 1869, Professor Rolleston, setting forth his objections to the earth-closet, said: "If I am told that the earth-closet is inoffensive, and that the privy is fœtid, I answer that a rattlesnake is none the less

dangerous because its rattle is removed; and that, for anything shown or known to the contrary, odor is to infection, deodorization to disinfection, what the noise of the serpent is to its bite." It is nine years since this was written, and amid all the voluminous reports upon the dry-earth system there is no word to sustain Dr. Rolleston's fears. On the other hand, together with much else of similar purport, the evidence of Dr. Monat reports that in those jails of India where the earth system is used, even at the time of the most serious cholera epidemics, this disease, which is so like typhoid in its mode of transmission, never gains a foothold. One would almost be justified in replying to Professor Rolleston, that it is not a question of removing the rattle, but of killing the snake. Investigations made to determine the manurial value of closet earth used many times over indicate a total and absolute destruction, not only of the odor but of the whole combustible material of the added *fæces*. The result has shown as complete destruction as would attend burning in a furnace.

This destructive oxidation depends upon the well-known concentration upon the surfaces of the interior particles of aerated porous substances. The intensity of the action is in proportion to the fineness of the material, or, in other words, to the total area of its interior surface.

It is perhaps not safe to assume that, in dealing with such dangerous material as typhoid excreta, treatment with dry earth, or ashes, or charcoal will suffice to render it harmless, but it will be more effective in this direction than anything else of which we have knowledge, and will at least prepare it for safe removal.

The physician in considering the treatment of the material in question has one of two sets of conditions to deal with. The *fæcal* wastes of the household which he is attending are either removed by water-carriage, or thrown into privy vaults. If by water-carriage, they are delivered into a public sewer or into a cess-pool. Sewers, as they usually exist, and cess-pools always and invariably, are so circumstanced as to favor the thorough development and multiplication of the morbid material under consideration. Unfortunately, sewers and cess-pools are so connected with the interiors of houses, with others as well as with that where the disease originated, as to make them too often the means for converting a sporadic case into a centre of infection. Even the house drains and soil-pipes through which the excrement passes on its way to the cess-pool or sewer are very generally as bad as these final receptacles themselves, while almost always the only barrier to the free return of their air and its poisonous freight into our very living rooms is the

water retained by a depression in the pipe (the trap), which water constantly absorbs and transmits the gases presented to it.

Where these water barriers are supplemented with one of the many mechanical check valves recently introduced, this means for the return of the infection is shut off. Where the soil-pipe and drain are freely open at both ends for the transmission of a current of atmospheric air, the danger of the development of the poison is greatly reduced, if not entirely removed. But even here, although we may feel secure so far as the immediate household in question is concerned, it is to be remembered that, at least in the case of a public sewer and of a cess-pool common to several houses, the matter deposited may produce its injurious effect in other families which are less well protected against it. Even where the cess-pool is connected with one house only, to permit the specific poison of typhoid fever to enter it and to spread itself through its accumulated filth is to incur a danger akin to that of establishing a gunpowder vault in one's back yard.

When infected fæces are to be thrown into a water-closet or drain, they should at least be treated with the strongest and most destructive chemical disinfectants, carbolic acid being by no means sufficiently so.

When the fæces of the household are received in a privy vault, it must be accepted as an imperative rule that typhoid dejections must never, under any circumstances, find access to this. Abundant and conclusive evidence shows that such accumulations of fæces only await the introduction of the least germ of any diarrrhœal disease to become by means of their exhalations and of their pollutions of the soil, active agencies of development.

Even when the earth-closet system is employed, none of the regular apparatus should be used by the patient, or become the receptacle of his dejections; this for the simple reason that it should be our first object to secure the most complete isolation of the tainted matter from every substance which might foster the increase of its tainting element.

It would be better, perhaps, to stop with this general statement of principles, leaving each practitioner to apply them according to his judgment, but one is tempted to recommend what one believes to be the most efficient process, and I therefore take the liberty of suggesting that a chamber or bed-pan, filled to the depth of an inch with dry earth, or with sifted anthracite ashes, or with powdered charcoal, be used to receive the evacuation; that this be immediately covered with a further inch in depth of dry material, and that the whole be turned into a *shallow* hole in the ground and covered with earth not more than two inches deep, so that it may go through with its decomposition in the upper

soil within easy reach of the oxidizing air. If to be removed quite away from the premises, the earth containing the dejections may be thrown into a barrel or box, each deposit being covered with fresh earth, and *carefully protected against rain.*

It would be out of place here to enter into all the details of the hygienic law. In a paper written for the profession this would be, too, a work of supererogation. At the same time it may be advisable, in this connection, to refer briefly to the manner in which, and the degree to which, the general health is influenced by exhalations from decomposing organic matters in sewers, house-drains, vaults, cess-pools, and cellars. It must have been the frequent experience of all physicians that every question as to the tainting of the air of a house from these sources is met by the assertion that no bad smell has ever been perceived. In the first place, the accustomed nostril is dull to detect a constant odor, and in the next it is hard to make people believe that, where they can smell no offense, there still may be danger. We ourselves know that the juices of the cadaver are most fatally dangerous before offensive decomposition has set in. Those who have given attention to the influence of drain-air in causing disease know very well that the action of this upon the health bears no relation to the intensity of its accompanying odors.

The only safety is to be sought in the absolute freedom of the air that is breathed, and of the water that is drunk, from every species of contamination due either directly or indirectly to organic decomposition. A little rift in the waste-pipe of a wash basin, so slight as to be detected only by the application of tissue-paper, has kept a whole family miserable and complaining, and susceptible to every species of contagion, for years together. Decaying vegetables in a cellar, and decaying filth in the waste-pipe of a kitchen sink, may be regarded as the bane of the existence of half the women in America. Those more serious defects which come of ignorantly arranged plumbing work—by no means of good plumbing work, which is the sanitarian's best aid—are responsible not only for most of the zymotic diseases appearing in the better class of houses, but in like degree for the generally ailing condition of so many of those who pass most of their days and nights in these houses.

The regulation of all these helps to healthfulness is a matter of detail which may well engage the best attention of the profession. Even the cataloguing and classification of the subject here would be impossible. The fundamental principle should always be borne in mind that neither in a sewer, nor in a cess-pool, nor in a house-drain, nor in a soil-

pipe, nor in the smallest waste-pipe should decomposition be allowed to proceed without such an abundant presence of fresh air as will secure its most rapid and complete progress. The same condition of obstructed decomposition which fosters the development of infecting agencies is precisely that which leads to a generally unwholesome and debilitating atmosphere. All investigation of this subject, and all discussion of the *modus operandi* by which unwholesome influences lead to the spread of epidemic diseases and to the lowering of the general health, bring us at the end to the firm belief in the principle covered by Hippocrates' prescription: "Pure air, pure water, and a pure soil."

APPENDIX.

LAWS OF RHODE ISLAND.

IN RELATION TO THE PUBLIC HEALTH, AND THE DUTIES OF THE STATE BOARD OF HEALTH.

GENERAL STATUTES.

CHAPTER 72.

SECTION 1. If nuisances or other causes injurious to the health of the inhabitants of any town, shall not be removed by the person permitting or erecting the same, pursuant to any order or regulation of the town council of the town, the town council shall thereupon adopt such measures as they shall deem effectual for the removal of such nuisances, or other causes injurious to the health of the inhabitants as aforesaid, at the proper charge and expense of the person erecting or permitting the same.

SEC. 2. The sheriff, his deputies, and the town sergeants and constables of the several towns, shall execute all such precepts and orders as shall be to them directed by said town councils, for carrying into execution the provisions of the section next preceding.

SEC. 3. The town councils of the several towns may designate and establish the place or places where the business of slaughtering cattle and other animals shall be carried on, which designation shall vest in the occupant or owner thereof a right to the use and occupancy of said place or places for the purposes aforesaid, until the same be withdrawn or suspended in the manner hereinafter provided, or until the same shall have been abated as a public nuisance.

SEC. 4. Whenever, in the judgment of the town council of any town, the convenience or health of said town requires that the right of slaughtering, as provided in the section next preceding, should be withdrawn or suspended, the said town council may suspend or withdraw said right, first giving to the owner or occupant of such place or places two months' notice, in writing, of the intention to suspend or withdraw the same.

SEC. 5. Every person who shall, after such notice has been given as aforesaid, commence or continue to exercise or carry on the business of slaughtering cattle or other animals, in such place or places, shall be fined fifty dollars for every day during which he shall continue to exercise or carry on the business aforesaid.

SEC. 6. In case of the suspension or withdrawal by any town council of the said right to slaughter cattle or other animals, the said town shall be liable to the person to whom such right has been granted, for any loss or damage consequent upon the withdrawal or suspension of said right, by any town council, to be recovered at a special court of common pleas, in the manner provided by law for cases within the jurisdiction of said court.

SEC. 7. Whenever the town council of any town shall have designated and established therein a place in which the business of boiling bones, depositing filth, keeping swine, or slaughtering cattle or other animals, may be carried on, as herein provided, every person who shall carry on such business in any other place, shall be fined fifty dollars for each day in which he shall carry on the same.

SEC. 8. Nothing herein contained shall be construed to deprive any farmer, not engaged or concerned in the business of slaughtering cattle or other animals, from erecting or continuing to use any building on his premises, for the purpose of slaughtering his own cattle or other animals, from time to time, as before accustomed to do.

SEC. 9. No person shall carry on the business of expressing oil from fish within any town, but at a place within such town to be designated by the town council thereof.

SEC. 10. Every person violating the provisions of the preceding section, shall be fined not less than one hundred dollars, nor more than five hundred dollars.

SEC. 11. Town councils of the several towns may prohibit burials in the compact or thickly populated parts of any town, and may make such by-laws and ordinances relating to the same, and the use of grounds for burials in such localities, as they may think necessary for preserving the health of such neighborhood, and may enforce such ordinances in the manner provided in the first and second sections of this chapter.

SEC. 12. The provisions of the third, fourth, fifth and sixth sections of this chapter shall extend to the place of any manufacture of, or of working in, any article or substance, the manufacture of which shall not be deleterious to the health of the neighborhood: *Provided*, that prior to any action of the town council under this section, public notice of the pendency of any petition therefor shall be given, in such mode, and for such time, as said council shall prescribe.

SEC. 13. The town councils of the several towns may make such rules and regulations as they shall deem necessary, to regulate and control the construction and location of all places for keeping swine, privy vaults, sinks, sink-drains, sink-spouts, cess-pools, and the outlets thereof, and may provide for the summary removal or reconstruction of all such as shall be by them deemed prejudicial to the public health, and may make rules prescribing the location of stables, and the time and manner of removing manure therefrom, or from privy-vaults or slaughter-houses, and for the driving of animals through the highways of their several towns; and every person violating any ordinance, rule, or regulation, made in pursuance of this section, shall be fined twenty dollars, to be recovered upon complaint and warrant before any justice court, to and for the use of the town wherein such violation shall occur.

CHAPTER 74.

OF REGULATIONS FOR THE PREVENTION OF INFECTIOUS AND CONTAGIOUS DISEASES.

SECTION 1. Every commander of any vessel which shall come into any port or harbor of this State, and shall have any person on board sick of the small-pox or any contagious or infectious distemper, or which has had any person sick of such distemper in the passage, or which shall come from any port or place usually infected with the small-pox, or where any other contagious or infectious distemper is prevalent, who shall bring such vessel to anchor in any of the ports of this State within the distance of one mile of any public ferry, pier, or landing-place, or permit or suffer any person on board such vessel to be landed, or any person to come on board such vessel, without a license first had and obtained from the town council of such town where such vessel shall arrive, shall be fined four hundred dollars.

SEC. 2. Such commander, on his first arrival in any port in this State, shall hoist and keep his colors in the shrouds of such vessel, as a signal of having come from any such infected place, or having infection or contagion on board.

SEC. 3. If any person shall come on shore from on board such vessel, without license first had and obtained as aforesaid, the town council may send back such offender immediately on board such vessel, or confine him on shore in such convenient place as to them shall appear most effectual to prevent the spreading of any infection; and the person so offending shall satisfy and pay all charges that shall arise thereon, and shall also be fined forty dollars.

SEC. 4. The town council of the town where such vessel shall arrive shall send a physician, or other suitable person, to examine into and make report to them of the true state of such vessel and the people on board, at the charge of the master or owner of such vessel; and they shall forthwith put on board such vessel some suitable person or persons to secure said vessel, and effectually prevent any communication therewith, at the like charge of the master or owner thereof.

SEC. 5. The town council of such town shall confine on board such vessel, or send to some hospital, or other suitable place, all persons who came in said vessel, for a convenient time, until such of them as have, or are liable to have, the small-pox or other infectious or contagious distemper, are perfectly recovered and cleansed from said distemper, or have passed a suitable quarantine; and also all persons who have gone on board said vessel without license as aforesaid, at the charge and expense of such persons respectively.

SEC. 6. The town council of such town shall appoint suitable persons to take effectual care that all goods, wares, and merchandise imported in such vessel, which they think liable to hold and communicate the infection or contagion, are landed in some suitable place to be appointed by such council, and cleansed in the manner by them directed, before they are permitted to be brought into any house, shop, or warehouse, other than where they are cleansed as aforesaid.

SEC. 7. Whenever such goods are sufficiently aired and cleansed, said persons shall give the owners or possessors thereof a certificate to that effect; and the town council shall allow and order said goods, wares, and merchandise, to be

delivered to the owners thereof; and the charge and expense of airing, landing, and cleansing such goods, wares, and merchandise, shall be borne by the respective owners; and such charge shall be a lien on such goods, wares, and merchandise.

SEC. 8. All goods that are judged by the town council not to be infected shall be delivered to the owners without delay and expense of airing, and as soon as may be consistent with the safety of the town in regard to other parts of the cargo; and all goods, wares, and merchandise, imported into any town by land from any place infected with the small-pox, or other contagious or infectious distemper, shall be aired and cleansed at the discretion of the town council of such town, and at the expense of the owners thereof as aforesaid, or destroyed if necessary.

SEC. 9. All goods imported in such vessel as aforesaid, that shall be clandestinely landed or brought into any house, shop, or warehouse, without a certificate and allowance as aforesaid, or that shall be imported by land as aforesaid, and not cleansed or aired by order of the town council as aforesaid, shall be forfeited; one-third to the use of the State, and the other two-thirds to the use of the person who shall sue for the same.

SEC. 10. The town councils of the respective towns shall fix, settle, and adjust all wages and charges demanded by persons employed by them, to secure such vessel, or to air and cleanse such goods, or to attend upon and nurse such persons as aforesaid.

SEC. 11. If any owner, freighter, mariner, or passenger, as aforesaid, shall refuse to pay such wages and charges so settled, adjusted, and fixed, then the town treasurer of such town shall sue for and recover such wages and charges, and the court where such action is brought shall tax double costs for the plaintiff, if he recover in his said action.

SEC. 12. Whenever the small-pox, or any other infectious or contagious distemper, shall be prevalent in any place or town, all persons who shall come from any such infected place or town into this State by land, before the expiration of ten days after they shall have left such infected place or town, shall be fined not exceeding one hundred dollars, nor less than ten dollars.

SEC. 13. The town council in any town may appoint proper persons at all ferries or places that to them may seem necessary, to examine on oath all persons suspected of violating the provisions of the section next preceding, and on reasonable cause of suspicion, may bring such offenders before some magistrate, that they may be dealt with according to law.

SEC. 14. Every householder or person shall immediately inform the town council of the town wherein he dwells, of any person in the house or tenement occupied by him, who has been taken sick of the small-pox, or any other contagious or infectious distemper, or suspected to be so.

SEC. 15. Every person violating any provision of the section next preceding, shall forfeit twenty dollars to the use of the town, to be sued for in the name of the town treasurer.

SEC. 16. Whenever the town council shall be so notified, they shall make proper examination by some physician or other skilful person; and if it be the small-pox, or other contagious or infectious distemper, wherewith such person is sick, they shall immediately set a proper guard to prevent the spreading of the contagion or infection, and shall remove said person to any such place in the

town as they shall think the most proper to prevent the spreading of the infection or contagion, or continue the said guard as aforesaid, according as to them shall seem necessary; and likewise they shall confine all such persons as may be by them suspected of having taken the distemper, in some proper place, until they are recovered and cleansed from the said distemper, or have performed a suitable quarantine.

SEC. 17. Whenever the small-pox, or other contagious or infectious distemper, shall break out in any house, and the infected persons be confined to such house, the town shall be at the expense of guarding the same, and the owner at the charge of cleansing the same, to be settled by the town council, which charges of cleansing, upon refusal to pay the same, shall be recovered by the town treasurer.

SEC. 18. In case the small pox, or other contagious or infectious distemper, shall break out in any house or family in any town, the town council thereof may remove any inhabitants of said town, visited with the small-pox, or other contagious or infectious distemper, to the hospital in said town, or other convenient place, in order to prevent the spreading of the infection; or otherwise, at their discretion, place a guard around the dwelling-house of the infected person, as to them shall seem necessary.

SEC. 19. So long as the town council of any town shall endeavor to prevent the spreading of the small-pox, any persons who shall visit any person suspected to have the small-pox, or shall go into the house where suspected persons are confined, without a license first had from the town council of the town, or of the attending physician, shall forfeit for every such offence twenty dollars; one-half to the use of the town where such offence is committed, and the other half to the use of the person who shall sue for the same; and such persons, on information of their offence, shall be liable to be confined until they are suitably aired and cleansed, or have performed suitable quarantine, at the discretion of the town council to whom complaint of the same shall be made.

SEC. 20. Whenever any person shall be found to be infected with the small-pox, it shall be the duty of the householder in whose house such infected person may be or reside, within twenty-four hours thereafter, to place a white flag not less than three feet in length and two in breadth, with the words "small-pox," in large black letters on both sides thereof, and so suspended as to be easily read, at or near the front door or principal entrance to such house, on the outside thereof, and to keep said flag up so long as there shall be any danger of taking the infection from said house.

SEC. 21. Every person who shall be convicted of wilfully and purposely spreading the small-pox, or other contagious or infectious distemper, within this State, shall be imprisoned for one year; and if any person shall die in consequence of the spreading of the small-pox, or other contagious or infectious distemper, as aforesaid, the person who shall be convicted of wilfully and purposely spreading the same, as aforesaid, shall be fined not exceeding five thousand dollars, and be imprisoned not more than five years, nor less than one year.

SEC. 22. If any physician, surgeon, or any other person lawfully required by any town council to do any duty relating to the prevention of the spreading of the small-pox, or executing any part of this chapter, shall refuse or neglect to perform the same, the performance thereof being in his power, such physician, surgeon, and other person, shall, for every offence, be fined forty dollars.

SEC. 23. In case any person shall hereafter be sick of any malignant, pestilential, or infectious disease, in any town, so as to endanger his life by being removed, or in case it shall appear that the disease be so spread that the atmosphere, in the judgment of the town council, has become so contaminated as to endanger the lives of those persons who reside or go into the neighborhood of the sick, the town council of such town may cause all such persons within such neighborhood to be notified to remove therefrom within three days; and if after that time any person shall remain there, the said town council may cause him to be forthwith removed at his own expense: *Provided*, that the expense of the removal of the poor, or such as are unable, in the judgment of the town council, to remove themselves, shall be paid out of the town treasury.

SEC. 24. The town councils in the several towns shall provide annually for the gratuitous vaccination of the inhabitants thereof.

SEC. 25. Such councils shall contract with and provide a suitable number of vaccinators to vaccinate as aforesaid; and order the treasurers of the several towns respectively to pay them such compensation as may be previously agreed upon; and the said vaccinators shall give due and reasonable notice of the time and place of meeting for the purpose of vaccination

SEC. 26. Such vaccinators, as soon after fulfilling said contract as may be convenient, shall place in the several town clerks' offices a book, in which shall be by them respectively recorded, in a fair and legible hand, the name and age of every patient by them vaccinated as aforesaid, and also such other remarks and observations as they may deem useful.

SEC. 27. Such clerks shall safely keep said books for the accommodation of such vaccinators and others, without any compensation, and deliver the same over to their successors; but they may charge lawful fees for searching the same, or for any copies.

CHAPTER 75.

OF QUARANTINE.

SECTION 1. Each seaport town, or the town council thereof, may appoint a health officer for such town, who shall visit all vessels which shall be subject to examination or quarantine, and carry into execution all regulations established by the town council, and shall be at all times accountable to said town council, and shall receive for his services such compensation as said council may allow, to be paid by the owners, agents, or commanders, of such vessels as may be subjected to quarantine or examination.

SEC. 2. Such town council shall cause to be published in one or more newspapers printed in this State, within or nearest the town wherein such rules and regulations shall be adopted, and at the proper cost and expense of the town, all rules and regulations made by them respecting quarantine.

SEC. 3. They shall prescribe from time to time the several ports, places, or countries, from which vessels arriving shall be subject to examination or quarantine.

SEC. 4. They shall designate the particular place in their harbor, bay, or river, adjacent to such town, where all ships or vessels arriving, subject to examination or quarantine, shall come to anchor; and shall define the limits of such quarantine ground, and assign the time for which such ships or vessels shall be detained, and where and how unladen.

SEC. 5. They may appoint a sentinel, who shall be paid by the town and be stationed in some convenient place on shore, or in some boat or vessel properly situated, to hail all ships or vessels which may arrive in such river, bay, or harbor; and if such sentinel shall find any ship or vessel is subject to quarantine, he shall direct the commander thereof to come to anchor within the limits of such quarantine ground, and there remain until visited by the health officer, and to place a signal in said vessel's shrouds in such manner as to be seen at a proper distance.

SEC. 6. Every commander of a ship or vessel who shall, upon being hailed and directed by such sentinel, refuse or neglect to bring his ship or vessel to anchor within the limits as above described, shall be fined not exceeding five hundred dollars, nor less than twenty dollars, to the use of the town.

SEC. 7. The town council may order such ship or vessel to be anchored on the quarantine ground, at the expense of the owners, master, or commanding officer thereof, there to remain until legally discharged therefrom.

SEC. 8. Every person who shall leave any ship or vessel under order of quarantine, without permission from the health officer or the town council of such town, shall forfeit not exceeding twenty dollars; and said town council may order such person to be returned on board of such vessel, there to remain until said council order him to be dismissed.

SEC. 9. If any vessel shall arrive in the waters of this State, bound to the port of Providence, at any time while the quarantine regulations of said city are in force, no person on board such vessel shall enter into the city of Providence, the village of Pawtuxet, or the compact part of the town of Cranston, until such vessel shall have been visited and examined by the health officer of said city, and permission shall have been given by such health officer, or by the board of aldermen of said city, to such person, to enter therein.

SEC. 10. Every person so entering into said city, village or town as aforesaid, without such permission first had and obtained, shall forfeit not exceeding twenty dollars; and said board of aldermen may cause such person to be returned to such vessel in case she is under quarantine, there to remain until permitted to depart therefrom.

SEC. 11. Every sheriff, deputy sheriff, town sergeant, and constable shall carry the rules and regulations of the town council within his precinct, into effect.

SEC. 12. Every forfeiture for the violation of any of the provisions of this chapter shall be sued for in the name of the town treasurer of the town where the offence was committed, and shall enure to such town.

CHAPTER 76.

OF CONTAGIOUS DISEASE AMONG CATTLE AND OTHER ANIMALS.

(As amended April, 1878.)

SECTION 1. Every person bringing into this State any neat-cattle or other animals which he knows to be infected with any infectious or contagious disease, or who shall expose such cattle or other animals, known to him to be so infected, to other cattle and animals not infected with such disease, shall be fined not less than one hundred dollars, nor more than five hundred dollars.

SEC. 2. The town councils of the several towns may pass such ordinances as they may think proper, to prevent the spread of infectious or contagious diseases among cattle and other animals within their respective towns, and may prescribe penalties for the violation thereof, not exceeding twenty dollars for any one offence.

SEC. 3. *Repealed at January Session, 1878.*

SEC. 4. The State Board of Health may prohibit the introduction of any cattle or other domestic animals into this State. And every person who shall bring, transport, or introduce any cattle or other domestic animals into this State, after said State Board of Health, or any one of them, shall have issued an order forbidding the same, or after the said Board shall have published for five successive days an order in such newspapers published in this State as the Board may direct, forbidding such introduction, shall be fined not more than three hundred dollars for every offence; and every officer or agent of any company, or other persons who shall violate such order, shall be subject to the fine aforesaid. In case of the introduction into this State of a number of cattle or other domestic animals, contrary to the orders of such Board, the introduction of each animal shall be deemed a separate and distinct offence.

SEC. 5. Said Board shall endeavor to obtain full information in relation to any contagious disease which may prevail among cattle or other domestic animals near the borders of the State, and shall publish and circulate such information at their discretion; and should any such disease break out, or should there be reasonable suspicion of its existence among cattle or other domestic animals in any town in this State, they shall examine the cases, and publish the result of their examination, for the benefit of the public.

SEC. 6. Said Board may appoint suitable and discreet persons, on or near the several highways, turnpike-roads, railroads, and thoroughfares in the State, who shall inquire into all violations of this chapter, and report the same to the Board for immediate prosecution.

SEC. 7. If any person, during the existence of said Board, shall sell, or offer to sell, any cattle or other domestic animals, or any part or parts thereof, known to him to be infected with any contagious disease, or with any disease dangerous to the public health, or shall sell, or offer to sell, any milk from any such cattle or other domestic animals, he shall be fined not more than one thousand dollars, or be imprisoned not exceeding two years, or both, at the discretion of the court.

SEC. 8. The said Board may make all necessary regulations for the prevention, treatment, cure, and extirpation of such disease; and the value of all cattle or



other domestic animals killed by the written order of the Board, shall be appraised by three disinterested persons to be appointed by the Board, such appraisal to be made just before the cattle or other domestic animals are killed, and the amount of such appraisal shall be paid by the State to the owner of such cattle or other domestic animals; and every person who shall fail to comply with any regulation by them so made, shall be fined not more than three hundred dollars, or be imprisoned not more than one year.

SEC. 9. Whenever the said Board shall make and publish any regulations concerning the extirpation, cure, or treatment of cattle or other domestic animals infected with, or which have been exposed to, any contagious disease, such regulations shall supersede the regulations made by the authorities of the several towns and cities upon the same subject; and the operation of such regulations made by said authorities shall be suspended during the time those made by the Board, as aforesaid, shall be in force.

SEC. 10. The said State Board of Health shall keep a record of their doings, and make report of the same to the January Session of the General Assembly next after the time of their appointment, unless sooner required by the Governor.

SEC. 11. All orders, appointments, and notices from the said Board, except the order of notice provided for in section 4, shall bear the signature of the president or chairman, and secretary.

SEC. 12. Every prosecution for a violation of any of the provisions of this chapter, shall be commenced within thirty days from the commission thereof.

CHAPTER 77.

OF THE REGISTRATION OF BIRTHS, DEATHS, AND MARRIAGES.

(As amended April, 1878.)

SECTION 1. The town clerks of the several towns, or in lieu thereof, any person whom the board of aldermen of any city, or the town council of any town, may appoint for that purpose, are hereby authorized and required to obtain, chronologically record and index, as required by the forms prescribed by the third section of this chapter, all information concerning births, marriages, and deaths, occurring among the inhabitants of their respective towns; and on or before the first Monday of March, annually, to make duly certified returns thereof to the Secretary of the State Board of Health, for each year, ending on the thirty-first day of December, accompanying the same with a list of those individuals, required by law to make returns to him, who have neglected the same, and with such remarks relating to the object of the law, as they may deem important to communicate.

SEC. 2. The Secretary of the State Board of Health shall receive the returns made in pursuance of the preceding section, and annually make and publish, not exceeding one thousand copies, a general abstract and report thereof, in form as

prescribed by section third of this chapter. The Secretary of State shall then cause said returns to be arranged, full alphabetical indices of all the names to be made, the whole to be bound in convenient sized volumes, and carefully preserved in his office, for which he shall receive the sum of fifty dollars.

SEC. 3. The blank forms required to carry out the provisions of this chapter shall, on application, be furnished by the Secretary of the State Board of Health, to clergymen, physicians, undertakers, town clerks, clerks of the Society of Friends, and other persons requiring them, substantially after the following forms, viz.: The record of a birth shall state the date and place of birth, name and sex of the child, whether living or still-born, the name and surname, color, occupation, residence, and birth-place of the parents, and the time of recording, so far as the same can be ascertained. The record of a marriage shall state the date of the marriage, place, name, residence, and official station of the person by whom married, names and surnames of the parties, age, color, occupation, and residence of each, condition (whether single or widowed), what marriage, if second, third, or other marriage, the occupation, birth-place, and name of their parents, and the time of recording, so far as the same can be ascertained. The record of deaths shall state the date of death, name and surname of deceased, the sex, color, and condition (single or married), age, occupation, place of death, place of birth, names and birth-place of parents, disease, or cause of death, and the time of recording, so far as can be ascertained.

OF MARRIAGES.

SEC. 4. Every Society of Friends, clergymen and all others, authorized to join persons in marriage, shall make a faithful record of every such rite performed by them, in manner and form aforesaid, and return the same on or before the second Monday of every month, for the last preceding month, to the clerk of the town in which such rite shall have been performed; and no marriage shall be solemnized until the parties shall have signed and delivered to the authority about to solemnize it, or to the clerk of a Society of Friends, a certificate containing the information required for the record of a marriage, as prescribed in the third section of this chapter.

OF BIRTHS.

SEC. 5. The clerk of every town shall, annually, in the month of January, collect the facts required by section third of this chapter, in relation to all children born in the town during the year ending the thirty-first day of December next preceding, and for each full report of a birth so obtained, the clerk shall receive ten cents, to be paid by the town in which the birth is recorded.

OF DEATHS.

SEC. 6. Whenever any person shall die in the State, it shall be the duty of the physician attending in his or her last sickness, within forty-eight hours after the death, to leave with the family, if any, or persons having the care of the deceased, or to give to the undertaker or person who conducts the funeral, a certificate stating the name of the deceased, the date of the death, and the disease or cause of death.

OF UNDERTAKERS.

SEC. 7. There may be appointed, by the town authorities of every town, a sufficient number of persons to act as undertakers, removable at the pleasure of the authorities.

SEC. 8. The undertaker, or the person who shall conduct a funeral, or who shall bury or deposit in a tomb the body of any deceased person, shall obtain the facts, required by section third of this chapter in relation to deaths, concerning such deceased person, together with the physician's certificate of the cause of the death, if a physician was in attendance, and on or before the second Monday of the next succeeding month, shall make a return of the facts obtained, together with the physician's certificate, to the clerk of the town in which the death occurred.

SEC. 9. Any town may enact municipal laws, more effectually to attain the objects herein contemplated: *Provided*, they do not conflict with the main and specific object of this act, viz.: to procure the most perfect registration.

OF FEES.

SEC. 10. The town clerks, or persons recommended and appointed as aforesaid, shall receive for each record of a death made and returned as required by law, and for each record of a marriage made and returned as required by law, twenty cents, to be paid to them out of their respective town treasuries: *Provided*, that the yearly compensation to be paid out of the town treasury as aforesaid, to any one town clerk or person appointed as aforesaid, who shall faithfully perform the duties prescribed by this chapter, shall not be less than five dollars. Undertakers and others making returns of deaths as required in section eight of this chapter shall receive for each full report of a death made to the town clerk, five cents in the cities of Providence or Newport, and ten cents in the other towns of the State.

SEC. 11. If any clergyman, physician, undertaker, town clerk, clerk of any meeting of the Society of Friends, or other persons, shall wilfully neglect or refuse to perform any of the duties imposed on, or required of him, by this chapter, he shall, at the discretion of the court trying the cause, be fined not exceeding twenty dollars for each offence, one-half thereof to the use of the town in which the offence shall occur, the other half to the use of the person who shall complain of the same.

SEC. 12. In order that it may be more surely ascertained that no clergyman, physician, coroner, undertaker, or clerk of the Society of Friends, neglects to make the returns specified in this chapter, each of the said parties shall cause his name and residence to be recorded in the clerk's office of the town where he resides.

SEC. 13. No letters of administration, or letters testamentary, shall be granted by any court of probate, upon the effects or estate of any person, until the death of such person, or the facts from which the same is presumed, shall be duly certified, as near as may be, to the town clerk, in order that the same may be duly registered according to the provisions of this chapter.

SEC. 14. Such books or registers, or a certificate duly certified by the town clerk, or person appointed as aforesaid, as containing a full copy of the record

of any marriage, birth, or death, shall hereafter be admitted in any court in this State, as *prima facie* proof of any marriage, birth, or death.

SEC. 15. Births, marriages, and deaths of non-residents, shall be distinguished from those of residents, in the returns, by being arranged separately.

SEC. 16. The Secretary of the State Board of Health may, from time to time, vary the forms of returns, and require such additional information as he may consider necessary, to effect the object of this chapter.

SEC. 17. *Repealed January Session, 1878.*

SEC. 18. The town clerks or other officers appointed under this chapter, to collect, record, and return the births in the several towns, shall receive fees therefor as follows: For collecting the facts required in relation to births, fifteen cents each; for making record and return of these facts as required by law, twenty cents each for the first fifty entries in each calendar year, and ten cents each for each subsequent entry and return.

SEC. 19. The returns required to be made by clerks of the supreme court, in relation to divorces, to the Secretary of the State Board of Health, or a prepared abstract thereof, shall be published in the annual report upon the births, marriages, and deaths in the State.

CHAPTER 119.

OF MEDICINES AND POISONS.

SECTION 1. No person, unless a registered pharmacist, or registered assistant pharmacist in the employ of a registered pharmacist, or unless acting as an aid under the immediate supervision of a registered pharmacist, or a registered assistant pharmacist, within the meaning of this chapter, shall retail, compound, or dispense medicines or poisons, except as hereinafter provided.

SEC. 2. Every person, in order to be a registered pharmacist or a registered assistant pharmacist, within the meaning of this chapter, shall be either a graduate in pharmacy, a practicing pharmacist, or a practicing assistant in pharmacy. Graduates in pharmacy shall be such as have obtained a diploma from a regularly incorporated college of pharmacy, and shall have presented satisfactory evidence of their qualifications to the State Board of Pharmacy. A practicing pharmacist shall be deemed to be a person who, on the 24th day of March, A. D. 1871, kept, and continued thereafter to keep an open shop for compounding and dispensing the prescriptions of medical practitioners, and for the retailing of drugs and medicines, and who shall give to the State Board of Pharmacy satisfactory evidence of his qualifications, and shall have declared his intentions in writing of keeping open shop for the compounding of prescriptions and the retailing of drugs and medicines; and such other persons as shall have given to the State Board of Pharmacy satisfactory evidence of their qualifications, and shall have declared their intentions in writing of keeping open shop for the compounding

of prescriptions and the retailing of drugs and medicines. A practicing assistant in pharmacy shall be deemed to be a person who shall have served three years' apprenticeship in a shop where the prescriptions of medical practitioners are compounded, and shall have passed a satisfactory examination before the State Board of Pharmacy.

SEC. 3. The State Board of Pharmacy shall consist of seven persons, to be appointed by the Governor from the registered pharmacists of the State, and shall hold office for the term of three years, and until their successors are appointed. The members of the pharmaceutical board of the State, appointed by the Governor, shall constitute, for the term for which they were appointed, the State Board of Pharmacy, within the meaning of this chapter. On the first of July, A. D. 1873, and in every third year thereafter, the Governor shall appoint the State Board of Pharmacy; and in case of vacancy at any time, arising from resignation, death, or removal from the State, the Governor shall have power to fill such vacancy from the registered pharmacists of the State. Four members of said board shall constitute a quorum. Said board shall organize by the election of a president and secretary; both of whom shall sign all certificates and other official documents. Said board shall meet twice a year, and shall have power to make by-laws and all necessary regulations, not repugnant to law, for the proper fulfilment of their duties. The secretary of said board shall also be registrar of pharmacists. The duties of said board shall be, to examine all applicants for registration; to direct the registration by the registrar of all persons properly qualified or entitled thereto, and report annually to the General Assembly on the condition of pharmacy, together with the names of all registered pharmacists and assistant pharmacists. The duties of the registrar of pharmacists shall be, to keep a book in which shall be entered, under the supervision of the State Board of Pharmacy, the name and place of business of every person who shall apply for registration. The registrar shall note the fact against the name of any registered pharmacist, or assistant pharmacist, who may have died or removed from the State, or disposed of or relinquished his business, and shall make all necessary alterations in the location of persons registered under this chapter.

SEC. 4. Every person applying for examination and registration shall pay to the State Board of Pharmacy ten dollars, and on passing the examination required, shall be furnished, free of expense, with a certificate of registration. Every registered assistant pharmacist may, with the consent of said board, be entitled to registration as a registered pharmacist, and shall be furnished with a certificate of registration, for which certificate he shall pay the registrar one dollar. Every certificate issued by said board shall be renewed annually, for which renewal one dollar shall be paid to the registrar. The fees received for examinations, registration, and certificates, shall be appropriated to defray the expenses of the State Board of Pharmacy.

SEC. 5. Every person, not a registered pharmacist, who shall keep open shop for the retailing and dispensing of medicines and poisons; or who shall take, use, or exhibit the title of registered pharmacist; and every person who shall violate any of the provisions of this chapter, shall, upon the first conviction, be fined fifty dollars, and upon the second, and every subsequent conviction, shall be fined one hundred dollars; and all fines recovered shall enure, one-half to the State,

and the other half to the complainant: *Provided, however*, that in towns or parts of towns where there is no registered pharmacist within three miles, it may be lawful for any person to sell the usual domestic medicines put up by a registered pharmacist, and marked with his label; such person procuring annually a certificate from the State Board of Pharmacy therefor, and paying one dollar for such certificate.

SEC. 6. Nothing hereinbefore contained shall apply to any practitioner of medicine, who does not keep open shop for the retailing, dispensing, or compounding of medicines or poisons, nor prevent him from administering or supplying to his patients such articles as he may deem fit and proper; nor shall it interfere with the making and dealing in proprietary medicines (popularly called patent medicines), unless such medicines be wholly or in part composed of some of the articles enumerated in schedule A, of this chapter; nor with the business of wholesale dealers in supplying medicines and poisons to registered pharmacists and physicians, and for use in the arts.

SEC. 7. No person shall hereafter sell, either by wholesale or retail, any of the poisons enumerated in schedule A, of this chapter, without distinctly labelling the bottle, box, vessel, or paper, and wrapper or cover in which said poison is contained, with the name of the article, the word POISON, and the name and place of business of the seller; and every registered pharmacist selling or dispensing any of said poisons shall first enter in a book, to be kept for that purpose only, and subject always to inspection by the State Board of Pharmacy, or any officer or agent thereof, or other proper authority, and to be preserved for at least five years, a record of the same in accordance with schedule B, of this chapter: *Provided*, that if any of said poisons form a part of the ingredients of any medicine or medicines compounded in accordance with the written prescription of a medical practitioner, the same need not be labelled with the word poison; but all prescriptions, whether or not composed in part or in whole of any of said ingredients, shall be carefully kept by the pharmacist on a file or in a book, used for that purpose only, and numbered in the order in which they are received or dispensed, and every box, bottle, vial, vessel, or packet containing medicines so dispensed, shall be labelled with the name and place of business of the registered pharmacist so dispensing said medicine, and be numbered with a number corresponding with that on the original prescription, retained by said pharmacist on such book or file. Such prescription shall be preserved at least five years, and shall be open to the inspection of the writer thereof, and a copy shall be furnished free of expense, when demanded by either the writer or the purchaser thereof.

SEC. 8. Every person who shall knowingly adulterate, or cause to be mixed, any foreign or inert substance with any drug or medicinal substance, or any compound medicinal preparation recognized by the pharmacopœia of the United States, or of other countries, as employed in medicinal practice, with the effect of weakening or destroying its medicinal power, or who shall sell the same knowing it to be adulterated, shall, in addition to the penalties prescribed in section five hereof, forfeit to the use of the State, all articles so adulterated found in his possession, and shall be deprived of the right of practicing as a pharmacist in this State thereafter. Whenever complaint shall be made of any violation of the provisions of this section, the State Board of Pharmacy, on being notified

CHAPTER 289.

AN ACT IN AMENDMENT OF CHAPTER 74, OF THE GENERAL STATUTES, "OF REGULATIONS FOR THE PREVENTION OF INFECTIOUS AND CONTAGIOUS DISEASES."

It is enacted by the General Assembly as follows :

SECTION 1. Every physician, householder or other person, having knowledge of the existence of small-pox in any town shall immediately give information thereof to the town clerk of the town in which the person sick with the small-pox resides, or may be, and in cities shall give like information to the superintendent of health.

SEC. 2. Whenever the town clerk of any town shall have knowledge, or shall have received information as provided in the preceding section of the existence of small-pox in his town, he shall forthwith give or cause notice thereof to be given to the town council of such town, at the expense of the town, to be audited and allowed by the town council.

SEC. 3. Every physician, householder, town clerk, or other person, violating any provision of the two preceding sections, shall pay a fine of twenty dollars, or be imprisoned not exceeding ninety days, either or both in the discretion of the court.

SEC. 4. Whenever any person shall be found to be infected with the small-pox any town, the town council of such town and the superintendent of health in the several cities, shall, within twenty-four hours after receiving information thereof, cause a white flag with the words "SMALL-POX" in black letters, not less than six inches in length, inscribed thereon, so suspended or fastened as to be easily read, to be placed at or near the front door or principal entrance of the building in which such infected person may be or reside, and to keep such flag so placed so long as there shall be any danger of taking the infection from said building.

SEC. 5. Every person who shall deface or remove any such flag without the permission of such town council or superintendent of health, shall pay a fine of twenty dollars and be imprisoned not exceeding ninety days.

SEC. 6. Every person in any house where there is any one sick with the small-pox or other contagious or infectious disease, or who is in any small-pox hospital, who shall voluntarily leave the same without a permit from the town council, or the physician employed by such town council, or from the superintendent of health in cities, shall pay a fine of twenty dollars and be imprisoned not exceeding ninety days.

SEC. 7. This act shall take effect from and after its passage, and all acts and parts of acts inconsistent herewith are hereby repealed.

CHAPTER 488.

AN ACT IN AMENDMENT OF CHAPTER 77, OF THE GENERAL STATUTES, "OF THE REGISTRATION OF BIRTHS, DEATHS, AND MARRIAGES."

It is enacted by the General Assembly as follows:

SECTION 1. The words in Section 1 of said Chapter 77, "upon the written recommendation of an authorized committee of the Rhode Island Medical Society," and the words in Section 10 of said chapter "recommended and," are hereby stricken out.

SEC. 2. Section 6 of said Chapter 77 is hereby amended so as to read as follows: "Whenever any person shall die, or any still-born child shall be brought forth in this State, it shall be the duty of the physician attending at such bringing forth or last sickness, if any physician so attended, within forty-eight hours after such death or bringing forth, to leave with the family, if any, or person having the care of the deceased, or the person bringing forth such still-born child, or to give to the undertaker or person who conducts the funeral, a certificate stating in case of a death the name of the deceased, the date of the death and the disease or cause of the death, and in case of the bringing forth of a still-born child, the date and the cause of such child being brought forth still-born."

SEC. 3. Section 8 of said chapter is amended so as to read as follows: "The undertaker, or the person who shall conduct a funeral, or who shall bury or deposit in a tomb, or who shall remove from this State or otherwise dispose of the remains of any deceased person or still-born child, shall first obtain the physician's certificate required by Section 6 of this chapter, if a physician was in attendance upon such person who has deceased, or the person bringing forth such still-born child, and shall return the same, together with his own certificate of the facts required by Section 3, as hereby amended, on or before the second Monday of the next succeeding month, to the clerk of the town where such death or bringing forth took place."

SEC. 4. Section 14 of said chapter is amended so as to read as follows: "The person appointed as provided in Section 1 of this chapter, shall be entitled to have the custody of all records of births, deaths or marriages of the town or city for which he is appointed, whether made under the statute, now in force or any former statute, and a certificate signed by him as town or city registrar, certifying that any written or printed statement of any marriage, birth or death is a true copy of the record in his custody, shall be admitted as *prima facie* proof of such marriage, birth or death.

SEC. 5. This act shall take effect from and after its passage.

CHAPTER 680.

AN ACT TO ESTABLISH A STATE BOARD OF HEALTH.

It is enacted by the General Assembly as follows :

SECTION 1. The Governor, with the advice and consent of the Senate, shall appoint six persons, two from the county of Providence, and one from each of the other counties, who shall constitute the State Board of Health. Of the persons so appointed, at least three shall be well educated physicians and members of some medical society incorporated by this State. The Governor may remove any member for cause, at any time, upon the written request of two-thirds of the Board.

SEC. 2. The six persons first appointed, shall be appointed for one, two, three, four, five and six years respectively, and hereafter, the Governor, with the advice and consent of the Senate, shall appoint one member of the Board annually, for the term of six years from the first day of July. Any appointment to fill a vacancy, shall be for the remainder of the term.

SEC. 3. The Board shall take cognizance of the interests of life and health among the citizens of the State; they shall make investigations into the causes of disease, and especially of epidemics and endemics among the people, the sources of mortality, and the effects of localities, employments, conditions and circumstances on the public health, and shall faithfully do all in their power to ascertain the causes and the best means for the prevention of diseases of every kind in the State. They shall publish and circulate, from time to time, such information as they may deem to be important and useful for diffusion among the people of the State, and shall investigate and give advice in relation to such subjects relating to the public health, as may be referred to them by the General Assembly, or by the Governor when the General Assembly is not in session.

SEC. 4. The State Board of Health shall also investigate the subject of diseases among cattle or other animals, and perform all the duties which have been delegated to the Board of Cattle Commissioners in Chapter 76, of the General Statutes of the State.

SEC. 5. Section 3, of Chapter 76, of the General Statutes, is hereby repealed, and the Board of Cattle Commissioners heretofore constituted under authority of said section, is hereby abolished.

SEC. 6. In every section of Chapter 76, of the General Statutes, where the word "commissioners" occurs, it shall be construed to mean State Board of Health.

SEC. 7. The State Board of Health shall receive the returns of births, marriages, deaths and divorces, and shall prepare the annual report upon the registration of the same as now required by law, but after the report is prepared, the returns shall be deposited in the office of the Secretary of State, to be bound and indexed by him as heretofore.

SEC. 8. Wherever the words "Secretary of State" occur in sections 1, 2, 3, 16 and 19, of Chapter 77, of the General Statutes, they shall be construed to mean Secretary of the State Board of Health, and in the sixth line of Section 2, of said

chapter, the word "he" shall be construed to mean Secretary of State. Section 17, of Chapter 77, of the General Statutes is hereby repealed.

SEC. 9. The Board shall meet in the city of Providence once in three months, and as much oftener as they may deem necessary. No member of the Board, except the Secretary, shall receive any compensation for his services; but the actual personal expenses of any member, while engaged in the duties of the Board, shall be paid by the State.

SEC. 10. The Board shall elect a well qualified physician as their Secretary.

SEC. 11. The Secretary shall perform and superintend the work prescribed in this law and such other duties as the Board may require, and he shall receive such salary, not in excess of twelve hundred dollars per annum, as the Board may determine. He shall hold his office at the pleasure of the Board, but may be removed at any regular meeting by a majority vote of the members thereof.

SEC. 12. The Governor shall provide a suitable office for the Board, in the city of Providence, and the actual expenses of the Board and of the members thereof, when certified by the Chairman and approved by the Governor, shall be paid from the treasury of the State.

SEC. 13. The Board shall make a report in print, to the General Assembly, annually in the month of January, of its proceedings during the year ending on the thirty-first day of December next preceding, with such suggestions in relation to the sanitary laws and interests of the State as they shall deem important.

SEC. 14. All acts and parts of acts inconsistent herewith are hereby repealed.

SEC. 15. The several town councils and boards of aldermen shall still be *ex-officio* boards of health in their respective towns, as is now by law provided; *provided, however*, that the city council of any city may appoint a board of health for such city, which shall have all the powers and duties now conferred by law upon the board of aldermen as a board of health.

NOTE.—There are, also, in addition to the preceding Chapters, other Statutes having relation to the public health and protection of life, and providing for the inspection of milk, of meats, of kerosene and other coal oils, of saleratus, soda, cream of tartar, etc.

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SECOND ANNUAL REPORT
OF THE
STATE BOARD OF HEALTH,
OF THE
STATE OF RHODE ISLAND,
FOR THE
YEAR ENDING DEC. 31, 1879.



PROVIDENCE:
E. L. FREEMAN & CO., PRINTERS TO THE STATE.
1880.

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1880.

GENERAL REPORT OF THE BOARD.

To the Honorable the General Assembly :

The State Board of Health of the State of Rhode Island, herewith presents, embodied in the Second Annual Report of the Secretary of the Board, a record of its general proceedings during the year ending December 31st, 1879:

The Report of the Secretary is designed to be what the word implies, i. e., an account of the *general* action of the Board, and the *general* work of the Secretary during the year, and not including many investigations of limited importance, the processes and results of which it was not deemed expedient to present, and also, not including an account of some investigations in progress, but not sufficiently advanced to show definite results.

The members of the Board at the close of the year were the same as at the organization, with the exception of Dr. Oliver C. Wiggin, who was appointed a member by the Governor in April, to fill the vacancy caused by the resignation of the Secretary.

Dr. A. G. Sprague, one of the original members, whose term of office had expired, was reappointed by the Governor at the May Session of the General Assembly.

VITAL STATISTICS.

In the body of the Report of the Secretary will be found the Vital Statistics of the State, for the year 1878, with comments on the same, in regard to the relations which the several classes of events bear to each other, and the relations of each of the several classes to season, sex, percentage, age, locality, &c., during that year. There will also

be found comparisons of one year with another, in regard to the different relations above mentioned, and also comparisons of the same during periods of from ten to twenty-six years.

Of the *causes* of death, a considerable number of summaries and synopses for long periods of years are given, presenting various comparisons, and showing the various relations of the causes, with comments.

It had been the design of the Secretary to have prepared, as an appendix to this Report, a summary of the Vital Statistics of the State for the year 1879; but up to this date, and the completion of the press work of the Report, of the Secretary, the Registration Returns for that year have not all been received from the towns.

These statistics are a part of those prepared by the Secretary of the Board for the Twenty-Sixth Registration Report on the Births, Marriages and Deaths, in Rhode Island, in 1878.

The value of the complete Vital Statistics of a State, in their legal, social and sanitary relations, is too highly appreciated by all well informed persons, to need commendation.

MONTHLY RETURNS OF PREVAILING DISEASES.

At the commencement of the year, the Secretary issued blank forms for the return by the medical correspondents in the several towns of the State, of the acute diseases prevalent in their several circuits, with the various attendant circumstances of the same, during each month of the year. Suggestions in regard to these returns, with questions and blank forms, and tabulated summaries of the monthly reports, may be found on pages 148 to 169, inclusive.

ANNUAL REPORT WITH TOPOGRAPHY OF TOWNS.

At the close of the year it seemed desirable that a report, giving an account of the general status of the public health in the several sections of the State, during the entire year should be made, and also a description of such topographical and industrial features, conditions and circumstances, as appertain to each of the several towns, or portions of towns, whether general or peculiar, which possibly or presumably might be concerned in the production of disease.

A circular sent to correspondents, and replies thereto, may be found in the Secretary's Report, on pages 170 to 199, inclusive.

REPORTS FROM TOWNS,

In Relation to Legal Sanitary Measures taken in 1879.

For the purpose of ascertaining what ordinances had been passed, or what legal action had been taken by town councils, or local boards of health, during the year 1879, in the direction of public sanitation, the following inquiry was forwarded to the town clerks of all the towns in the State:

“What legal measures or regulations have been adopted, or work of a public or private nature contemplated, commenced or completed in 1879, by the consent, or under the direction of the town council of your town, or any legally authorized health officer or board of health in the town, in relation to the promotion of the public health.”

The replies to the above interrogatory may be found on pages from 200 to 208, inclusive.

CATTLE COMMISSION.

By reference to the report of the Secretary, it will be seen that the attention of the Board has been largely and earnestly directed to the protection of the public from the great pecuniary losses which would otherwise have occurred from the spread of that insidious disease called glanders. More than 2,000 horses have been examined, and a large portion of those affected with the disease which have come to the knowledge of the Board—numbering forty on the record of the Secretary—were found existing under circumstances rendering the infection of a large number of other animals almost certain, if the diseased animals had not been removed; and, doubtless, some of the horses since destroyed, and others still alive were infected by them. An account of the general proceedings of the Board in this department of its work, will be found on pages 209 to 228 of the Secretary's report.

ARTIFICIAL FEEDING OF INFANTS.

This essay, for which the Trustees of the Fiske Prize Fund, awarded the premium of two hundred dollars in June 1879, needs no commendation in this place. The valuable information presented, in regard to the dangers of injudicious methods of feeding, the use of improper kinds of diet, and improper modes of preparation; the suggestions as to the proper kinds of food; the best modes of preparation and the most rational methods of feeding, will be at once appreciated by the reader.

VENTILATION OF SCHOOL HOUSES.

This paper, written by one of the leading teachers of the State, whose unwearied labors in promoting the physical, as well as intellectual development of his pupils are well known, will present opinions based upon a long period of painstaking and persistent study of the subject.

It will be of especial value at this time, when opinions as to the best methods of securing the most perfect ventilation, are so various and many times so conflicting, as having the merit of a practical exemplification.

PROPER DISPOSITION OF THE EXCRETE OF THE INTESTINES AND KIDNEYS, SEWERAGE OF THE DWELLINGS, AND COLOR-BLINDNESS.

These papers have all a practical value, presenting a large amount of information of a novel and interesting character.

Respectfully submitted,

DAVID KING, *Chairman*.
ELISHA DYER, JR.,
OLIVER C. WIGGIN,
GEORGE W. JENCKES,
ALBERT G. SPRAGUE,
WM. E. C. WARDWELL,
CHARLES H. FISHER, *Secretary*.

JUNE 1, 1880.

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REPORT OF THE SECRETARY.

To the Honorable the General Assembly, and the members of the State Board of Health of Rhode Island :

Herewith is respectfully submitted the Second Annual Report of the Secretary of the Board.

It will present an account of the more public proceedings of the Board, and the work of the Secretary for the year ending December 31st, 1879.

The events of the year in regard to the average condition of the public health throughout the State, have not varied so greatly from the ordinary incidents of previous years, as to call for special action or remark.

The occurrence of fatal forms of disease in portions of the State, and especially of scarlatina in an epidemic form, in the city of Providence, and a few other localities, will be noticed in detail in another part of this report.

The proceedings of the Board in relation to its several duties, in the three departments of its work, namely, the investigation of the causes of disease, the supervision of vital statistics, and the superintendence of contagious diseases among domestic animals, will be presented more fully in detail, when these several departments of work are brought forward as topics for special consideration and report.

MEETINGS OF THE BOARD.

During the year there were, beside the regular quarterly meetings, three special meetings at which business was transacted, and there were several called meetings, at which there were not a sufficient number of members present to constitute a quorum.

At the adjourned *quarterly* meeting held APRIL 16, 1879, Dr. O. C. Wiggin, appointed by the Governor to fill the vacancy in the membership of the Board, occasioned by the resignation of Dr. C. H. Fisher, was present, and upon final qualification, was cordially welcomed by the older members.

At this meeting the following resolution, which will explain itself, was also passed:

"That inasmuch as the Secretary has by resignation, ceased to be a member of the Board, it is hereby ordained that he shall retain and exercise the same authority as when a member of the Board, to order the examination or safe keeping of any animal, suspected of having a contagious disease dangerous to life, and also the authority to order the killing and burying of such animal if deemed advisable."

At this meeting it was also voted,

"That the Secretary of the Board prepare a brief statement of the most apparent or obvious symptoms of the disease called Glanders or Farcy, in style for popular comprehension, and for the purpose of general distribution, in the form of circulars or tracts."

At a meeting held on WEDNESDAY, MAY 21, 1879, among other transactions, including a paper by the Secretary, giving the most prominent and obvious symptoms of Glanders and Farcy in horses, and which will be further alluded to on another page, was the passage of the following resolution, to wit:

Resolved, That for the purpose of greater certainty in securing a quorum at every meeting of the State Board of Health, it is desirable that the Secretary be made a member *ex-officio*, and the Chairman is hereby requested to present the said resolution to the Honorable the General Assembly, at the May session of 1879, in Newport.

The act establishing the State Board of Health, provides that the terms of office of persons appointed to membership on the Board, shall commence on the first day of July. On account of that provision, the Board has made the *quarterly* meeting in July the ANNUAL MEETING for the election of officers, and for such other transactions as usually come before the annual meeting of any corporate body.

Inasmuch as the act requires the annual report to comprise the regular calendar year, ending December 31st, and as the fiscal year in Rhode Island now covers the same period of time, it is somewhat embarrassing to have the annual meeting of the Board in the middle of the year.

It is hoped that an early amendment of the act, making the term of membership to commence on the first day of January, will remove all annoyance in respect to the annual meeting.

ANNUAL MEETING.

Following the precedent of the previous year, the Board held the annual meeting on the first WEDNESDAY in JULY.

After the usual routine business of regular meetings, the Board proceeded to the election of officers, for the year ending on the first Wednesday of July, in the year 1880, with the following result, namely: .

For Chairman, DAVID KING, M. D.....Newport.

For Secretary, CHARLES H. FISHER, M. D.....North Scituate.

For Auditor, Hon. ELISHA DYER, Jr.....North Kingstown.

The following standing committees were also appointed:

DAVID KING, M. D., On topography and diseases of Newport.

Col. ELISHA DYER, Jr., On the domestic economy of food in its relation to public health.

GEORGE W. JENCKES, M. D., On epidemic, endemic and contagious diseases.

OLIVER C. WIGGIN, M. D., On the relation of public schools to the public health.

W. T. C. WARDWELL, Esq., On the relation of buildings, public and private, to the public health.

ALBERT G. SPRAGUE, M. D., On the relation of food and drinks to the public health.

At the annual meeting, the following question, which had been previously considered, was again discussed:

Is it advisable to furnish physicians, practicing in towns where burial permits are not required, with postal cards, upon which blank certificates of death, causes of death, &c., are printed, to be filled out by said physicians, in case no certificate of such death, and cause of death, be given the undertaker, or any other person, to be sent to the town clerk of the town in which such death occurred, within ten days after the event of such death; the said postal return of death to be then sent to the Secretary of the State Board of Health?

As a result, the Secretary was ordered to issue such blank postal card returns of death to physicians practicing in towns where burial permits are not required, with proper instructions in regard to the purpose and manner of use.

Further remarks will be made in relation to the purpose of the postal returns of death, in another place.

At a meeting held at the office of the Board, on WEDNESDAY, AUGUST 20, 1879, among others, the following transactions are a part of the records of the proceedings: "The Board ordered the publication of the circular or tract, prepared by order in April, and afterwards abridged by instructions from the Board." Said tract presenting the most obvious symptoms of glanders and farcy in horses.

It was also "ordered that the said tract be supplemented by directions for disinfecting stalls and other premises, where animals affected with contagious diseases dangerous to life had been kept;" and also, "that the said tract should contain the regulations adopted by the Board, in relation to contagious diseases among domestic animals, together with extracts from the General Statutes, showing the authority for the enforcement of the same."

At the same meeting, "the Secretary was authorized, if deemed expedient, to cause an inspection to be made of any or all the public or private stables in the city of Providence and vicinity."

This action of the Board, and the results, will be noticed in another place.

A committee was also appointed "to take into consideration the expediency of establishing a hospital for diseased horses, declared to be suspected, by competent authority, but suspicion not yet confirmed, of having glanders or farcy."

This transaction will also be referred to again, and reported upon in another place.

At the same meeting, a motion prevailed "To recommend to the Mayor and Board of Aldermen of the city of Providence, the consideration of the propriety of thoroughly cleansing and drawing off the water, *daily*, from the public horse watering places, as a means of diminishing the liability to infection from glandered horses having access to them."

This will be again referred to.

The Board also at the same meeting adopted a new rule or regulation, "which shall stand as regulation third, in relation to contagious diseases among domestic animals." It is as follows:

"No horse or other animal, declared by competent authority to be affected with glanders or farcy, shall hereafter be allowed to be kept for experiment."

The Board also, "in compliance with a communication from His Excellency the Governor, instructed the Secretary to notify the au-

thorities of the towns of North Kingstown and Jamestown that health officers should be appointed, and quarantine regulations adopted immediately, for the protection of their own citizens, and those of other towns."

The Governor's communication was as follows:

STATE OF RHODE ISLAND.

EXECUTIVE DEPARTMENT,

NEWPORT, August 18, 1879.

Dr. C. H. Fisher, Secretary of the State Board of Health :

SIR.—I request the immediate attention of your Board to the necessity of advising the Town Councils (acting as Boards of Health of the towns of Jamestown and North Kingstown, Wickford,) of the most prompt action on their part, in appointing health officers and establishing quarantine regulations. There is this day in the waters of Dutch Island Harbor, in the jurisdiction of Jamestown, a schooner from San Domingo, on board of which the wife of the captain and two of the crew have died within sixteen days, of *yellow fever*. There is nothing to prevent other infected vessels coming into the harbor, and I desire you to summon your Board together forthwith and take such prompt action in the premises as is proper.

I am, sir, your obedient servant,

CHARLES C. VAN ZANDT, Governor.

It may be as well to state here, that the notices were given as ordered, and the President of the Town Council of Jamestown, Hon. T. C. Watson, replied in three days thereafter that the Town Council of that town had held a meeting, and had instructed him "to ask for information as to the duties and powers of the Council in regard to quarantine regulations," as this was the first time such regulations had been called for.

The Secretary drew up some regulations to submit to the authorities of Jamestown, as requested, which were modified and enlarged by suggestions from Dr. Elisha Harris, Sanitary Inspector of the National Board of Health for the North Atlantic Coast, and Collector Pratt, of Newport.

The regulations proposed, premising that a health officer (who need not necessarily be a physician) should be appointed, were as follows:

I. That it shall be the duty of the health officer to visit all vessels immediately, on coming to anchor within the jurisdiction of the town of Jamestown, to examine into the sanitary condition of said vessels by personal inspection or otherwise as in his judgment may seem best.

II. That in case the said health officers shall find on board any vessel, any contagious or infectious disease, or that there *has been* any such disease on board said

vessel, or any vessel that has been recently in any port where any infectious disease is prevalent, he shall cause a yellow flag to be hoisted and kept constantly in the shrouds during the time the said vessel shall remain within the jurisdiction of the said town, and shall also require the commander of such vessel to give notice of the occurrence of any new case of infectious disease on board of said vessel, by such signals as the said officer may devise.

III. Said health officer shall allow no person to leave any vessel infected with a disease dangerous to life, or any vessel suspected of such infection, or go on board or visit any such vessel, without his permission.

IV. All supplies of every kind whatsoever shall be taken on board such vessel *only* by permission and under the direction of said health officer, and no articles of any kind whatsoever shall be taken out of or from such vessel to any landing place.

V. Every person who shall violate any of the regulations hereby adopted by the Town Council of the town of Jamestown, shall be deemed guilty of a misdemeanor, punishable by fine or imprisonment, in conformity with the General Statutes, and at the discretion of the court by which such offender shall be tried.

These regulations were adopted by the Town Council of Jamestown, immediately after their receipt.

In regard to the town of North Kingstown, it may be said that a necessity for the establishment, by the Town Council, of formal quarantine regulations, did not appear to exist. There is no harbor within its precincts, where coasting vessels from extreme southern ports, or vessels from foreign ports, are expected to put in for refuge or for supplies. The comparatively small number of vessels arriving in the harbor, and at the dock in Wickford, are mostly well known, and the arrival of a strange vessel, or any vessel in those waters from any suspected port, would be at once known to the authorities, and immediate steps taken for the public protection.

In justice to the authorities of the town of Jamestown, it should be said, that no danger had been apprehended from vessels hailing from infected ports, if any, and lying in Dutch Island Harbor, in the immediate vicinity of the shores of the town, for the reason that communication with such vessels was of infrequent occurrence, and from the expectation that proper notice would be given of any distress on board of any vessel in the harbor, and especially the fact of the presence, or suspicion of the presence, of any infectious disease on board.

It will be seen, however, that persons in the vicinity of the harbor were not exempt from danger, as there was nothing to prevent, if they desired to do so, persons coming on shore directly from infected vessels, and entering houses on shore; and when it is remembered that

not infrequently, during a stress of weather, from one hundred to one hundred and fifty sail of vessels find anchorage in Dutch Island Harbor, and during the warmest period of the year many of them have their last departure from ports infected with yellow fever, the necessity of every precaution will be apparent.

At the quarterly meeting of the Board on WEDNESDAY, OCTOBER 1st, 1879, the Secretary reported the printing and distribution of 5,000 copies of the Public Health Tract, No. 3, entitled "Glanders and Farcy." An account of the mode of distribution will be given in another place.

The Secretary also reported having employed a veterinary expert, to visit stables where glanders or farcy might be supposed to exist. The work was still progressing, 89 stables and 599 horses having been examined, one case of glanders only having been found. The names and location of the stables, the conditions in regard to repair, cleanliness and ventilation, the condition and apparent care of the horses, and the names of owners, were reported and recorded.

At the same meeting, the committee "To consider the expediency of establishing a hospital for diseased horses," reported "that circumstances, so far as known, did not seem at the present time to demand such an institution, but desired time for further inquiry and consideration," and was continued.

The Secretary also reported upon several matters of reference and work, which will be presented in another place.

At a meeting held on WEDNESDAY, NOV. 5, 1879, the Board voted to adopt an official seal.

It having been made known that Dr. King proposed to pass the ensuing winter in Europe, it was also moved and passed, "That David King, M. D., Chairman, be, and he is hereby appointed the accredited delegate of the Rhode Island State Board of Health to any similar organization, in any city or country in Europe."

At each of the meetings there was more or less of routine business, the regular reports of the Secretary in relation to work in the department of diseases among domestic animals, complaints of nuisances, prevailing diseases, etc., which it is needless to mention here, but of which some part will be reported elsewhere.

BY-LAWS.

No very important change has been made in the By-Laws during the year, and they stand as follows:

SECTION 1. This body shall be known as the Rhode Island State Board of Health.

SEC. 2. The officers of the Board shall consist of a Chairman, Secretary and Auditor, to be chosen annually at the meeting in July.

SEC. 3. The duties of the chairman shall be, to preside at the meetings of the Board, to put all votes, to decide questions of order, and to appoint all committees when not otherwise voted by the Board. He shall certify all audited bills to the Governor for payment.

SEC. 4. The Secretary shall perform all duties prescribed in the act establishing this Board, shall keep a record of the proceedings, shall do all acts usually incident to the office, and shall notify the members of all regular meetings, and by the advice of the Chairman, shall call all special meetings.

The Secretary shall have an office in the city of Providence, which he shall keep open between the hours of eleven A. M. and one o'clock P. M., upon all business days.

SEC. 5. The Auditor shall examine all bills and vouchers, and if correct shall certify the same to the Chairman of the Board.

SEC. 6. A majority of members shall constitute a quorum to transact business but any member may adjourn.

SEC. 7. The regular meetings of this Board shall be holden at its office in the city of Providence, on the first Wednesday of July, October, January and April, respectively, at such hour as the Board may by vote determine from time to time.

Such of the regulations as have been adopted, from time to time, and have reference to public acts, will be reported when the department of labor to which they have special reference is under consideration.

DUTIES OF THE BOARD.

Section 3d of the act establishing a State Board of Health, provides as follows:

"The Board shall take cognizance of the interests of life and health among the citizens of the State; they shall make investigations into the causes of disease, and especially of epidemics and endemics among the people, the sources of mortality, and the effects of localities, employments, conditions and circumstances on the public health, and shall faithfully do all in their power to ascertain the causes, and the best means for the prevention of diseases of every kind in the State."

In the discharge of these duties, the questions, in what manner and by what means, the work of investigation could be most effectually prosecuted, were prominently presented and considered. It was seen that to investigate the causes of disease, and especially of epidemics and endemics, the presence and the localities of the diseases must be known; and the conditions and circumstances under which they occurred, ascertained with all possible accuracy. It was also apparent that to obtain a knowledge of the presence and locality of disease, the best mode was the regular registration of prevailing diseases by practicing physicians, and a report of the same *immediately*, in cases of those of a contagious and epidemic character dangerous to life; and of endemic diseases, or diseases peculiar to some localities which were attended with unusual fatality; and weekly or monthly in all other cases.

REPORTS OF PREVAILING DISEASES.

In regard to obtaining reports of prevailing diseases, the Secretary obtained the consent of physicians, whose fields of practice covered every section of the State, to report monthly the diseases of most importance prevailing in their respective circuits; the mean degree of severity, approximate ratio of deaths, etc. These reports were wholly voluntary, and although from forgetfulness, and probably in some instances from indifference, the number which continued through the year to make regular reports was reduced nearly one-half, there are still correspondents enough to report from nearly all the towns in the State. But the reports so made do not give any estimate of the number of persons sick with any given disease, nor can either of the correspondents know how many deaths occur outside of their own practice. It is in respect to the mortality of any prevalent disease that another kind of report must be made to supplement the deficiency in the reports of the regular correspondents. That is, the returns of deaths in those localities where the kinds of prevalent diseases and estimated ratio of mortality has already been reported by correspondents, together with various attendant conditions of atmosphere and soil, as to dryness or humidity; the degree and fluctuations of temperature; amount of rainfall, etc. This subject of monthly correspondence will be considered at greater length in another place, under the head of Reports of prevalent Diseases.

MORTALITY REPORTS.

In regard to mortality reports, they doubtless furnish the most reliable data, and open the way most fully for the successful study of the causes of disease. It has been remarked by the eminent German statistician, Bencke, long in the employ of the Imperial State, that "mortality statistics are the basis of public as well as of private care of health. Every step forward in this direction is a gain to human working power and welfare."

Dr. William Farr, the highest living authority in Vital Statistics and Registration, says: "Deaths and causes of death are scientific facts which admit of numerical analysis. Science has nothing more inviting to offer than a study of the influence of civilization, occupation, locality, seasons and other physical agencies, either in generating disease or producing death, or in improving the public health."

IMPORTANCE OF ACCURATE RETURNS.

Recognizing the value of complete reports or returns of death, and especially of causes of death, the Secretary has, from the first, labored to secure from those persons whose duty it is to make returns of death and causes of death, the most prompt and efficient discharge of that duty. In the furtherance of this object, it seemed proper that the town councils and town clerks of all the towns in the State should have their attention directed to the importance of correct vital statistics, and the necessity of compliance on the part of the officials and towns people with the Registration laws of the State. The following quotations are from Circular C, sent to the town councils and town clerks early in the year. After calling attention to some other matters not needing repetition here, the circular reads as follows:

"It is expected every town clerk will comply with the law, as provided in Section 1, Chapter 77 of the Revised Statutes, especially when duly certified returns are made 'accompanying the same, *with a list of those individuals, required by law to make returns to him, who have neglected the same.*'"

"It is hardly necessary in this connection, to call your attention to the great value of correct registration, of the births, marriages and deaths in your town. In their civil relations, affording definite evidence as to legal consanguinity, and rights of inheritance or entailments, rights and claims for pensions, insurance, or hereditary annuities. In their social relations, as a record and evidence of the

the First Annual Report of this Board,) that the undertakers and physicians, as well as other persons having charge of the burial, or other disposition of the remains of deceased persons, had in much the largest number of the towns, made no returns whatever, or if any, they were the exceptions rather than the rule.

Under such a condition of neglect and violation of Statute laws, and consequent carelessness, it could not be otherwise than that the returns of *causes* of death, at least, must be in many instances incorrect. In those towns the returns of deaths are collected by the town clerk or some other authorized person during the months of January and February, in the year succeeding that in which the deaths occurred. It is easy to see how imperfect the collection for the whole preceding year must be.

DEATHS OF TRANSIENT PERSONS.

In some cases the decedents are merely visitors or sojourners in the town, and if the facts of the case are not ascertained at the time of death, they can never be afterward. Again, many families in which deaths have occurred, have removed before the end of the year into another town, or out of the State, and therefore no account, or no correct account of such decedents can usually be obtained in the town where the death occurred.

To meet the latter difficulty, in the case of families still living in the State, though not in the town where a death occurred, the Secretary has requested the town clerks to instruct the canvassers as follows:

“The collector should always be instructed to obtain returns of all deaths, which may come to his knowledge, not *previously reported* to the town clerk, and also to obtain information and make returns of deaths not previously reported that occurred in other towns, and in families residing in the town which he is canvassing, at the time the returns are collected, and the said returns should be transmitted *to the town in which the death occurred*. The fees will be the same as in the ordinary returns.”

“Physician’s certificate of *cause* of death should always be obtained when possible.”

“The necessity of exercising great diligence in obtaining correct information in regard to the vital statistics of the towns, should be strongly impressed on the minds of canvassers.”

POSTAL RETURNS OF DEATHS.

It has been previously stated that the Board, in order to secure more complete returns of deaths, and especially of the *causes* of deaths, had instructed the Secretary to have printed on postal cards, blank returns of death, to be sent to physicians practising in towns where burial or removal permits were not required. The following circular will more fully explain the result desired to be accomplished:

(CIRCULAR F)

OFFICE OF SECRETARY OF THE STATE BOARD OF HEALTH,

PROVIDENCE, July 15th, 1879.

DEAR DOCTOR:

You are aware of the difficulty of obtaining accurate returns of deaths and especially of the *causes* of deaths. Physicians many times are not called upon by either the undertaker, person who has charge of a funeral, or the relatives of the decedent for a certificate of the cause of death; nor do either of the parties make return according to law, consequently the proper authorities have no official notice of the occurrence of a death until made next year by the person who collects the returns of births. At that time many families in which a death occurred, will have removed from the town in which such death occurred, and not unfrequently a decedent is simply a visitor or temporary resident of the town in which the death occurred, consequently if a return was not made at the time of the decease, the record of such death will never be made, for the reason that the collector of returns, though having knowledge of the fact of a death, has no parties to apply to, for the purpose of properly filling out the blank interrogatories. And if families do not remove, the remembrance after many months of all the circumstances connected with the sickness and death of an individual are usually very indistinct, and especially with the physician, in whose mind the particulars of cases occurring many months previously, is crowded out by the multitude of other cases following. Therefore the causes of death (which are what the State Board of Health *particularly* desire to know) must in many instances be very imperfectly stated. No time is so favorable for accurate representation of the cause of a death as that immediately following the decease.

The object of the postal cards which accompany this circular, is to obtain from physicians, the filling out by them of the blank certificate, in all cases where they are not called upon by the undertaker or some other person for the usual certificate of cause of death, on or before the second Monday of the month next succeeding the occurrence of the death, and forward the same by mail as addressed on the face.

Care should be taken that the town in which the death occurs should be given, so that when the returns are received in the usual way from the town clerks, the postal returns may be compared with them, and thereby avoid any duplication in the Registration Report.

Please put these postal returns of death in a conspicuous place in your desk, so that your attention will be frequently called to the matter of filling out when circumstances require.

When the last postal return is forwarded, make the sign + in the lower left hand corner on the face of the card, and more will be sent immediately.

By complying with the request above, you will confer a favor on the State Board of Health, and aid materially in the work of investigating the causes of disease.

The Secretary also takes this occasion to request, that you report to the Board for publication, the occurrence of any epidemic, or sickness that attacks any considerable number of persons within your precinct, with all the circumstances of invasion, progress and termination of the same.

You are also desired to prepare a paper, for the same purpose, containing any pertinent facts or suggestions in relation to the cause or prevention of disease, with such comments and conclusions as seem to you reasonable and proper. Papers presenting facts that have come to your knowledge, and your conclusions therefrom, in regard to the communicability of diseases, the origin of infection, by what means conveyed, how long probably dormant, modes of attack, &c., &c., are especially desired.

Also notice of any source of disease, known to you, which is removable, and a statement of the means by which you believe the same may be removed.

Very truly yours,

CHAS. H. FISHER, *Secretary.*

The following is a copy of the form of the blank, printed on the back of the postal cards, the face having the address, Secretary State Board of Health:

RETURN OF A DEATH

PHYSICIAN'S CERTIFICATE.

In the Town of..... R. I.

1. Name?.....

2. Date of Death?.....187 . Age?.....

3. Disease? Primary.....

4. " Secondary.....

5. Immediate Cause of Death?.....

6. Sanitary Surroundings: Good?....Bad?....Average?....

7. Duration of Disease? Primary.....Secondary.....

.....*Physician.*

N. B.—At No. 2, probable age, if not known exactly. At No. 5, state whether from exhaustion, paralysis, hemorrhage, suffocation, or what. At No. 6, state yes or no to the questions. For out doors make sign, + over reply. For out and in both make sign, —

INVESTIGATION OF CAUSES OF DISEASE.

It will be noticed in the preceding circular, that physicians to whom the postal card blank returns of death were sent, were not only requested to make returns of death and causes of same, but as in other circulars, were requested to report the occurrence of any epidemic, or sickness that attacked any considerable number of persons in their precinct, with the circumstances of invasion, progress and termination of the same. And as a further means of leading to an investigation of the causes of disease, they were desired to present any facts that had come to their knowledge, in regard to the causes of disease and means of prevention. Some correspondents have reported in relation to the latter request, which will be presented when the subject of causes of death will be more fully considered. How many occurrences of death that were reported through the postal returns during the last half of the year 1879, and were not otherwise returned, can only be known when the full Registration Returns from the towns are all received, and the postal returns compared with them, to discover the number which are duplicated.

COLLECTION OF VITAL STATISTICS.

It is made one of the duties of the Board through its Secretary, to collect the returns of births, marriages, deaths and divorces, and prepare an annual report upon a registration of the same, by classification and tabulation in condensed form, and in addition thereto, supplementary tables and summaries, presenting comparative results and comments thereon. The preceding remarks in regard to mortality returns, and the measures taken by the Secretary to secure more complete returns of the same, will indicate also the interest felt, in securing reliable returns of all the different classes of events above enumerated. Some portions of circulars sent to town clerks and canvassers, have already been presented, and will show the general tenor of the whole.

The Registration Returns of all the towns in the State, comprising the whole number of births, marriages and deaths, reported as occurring in Rhode Island, in 1878, have been received by the Secretary, and in compliance with the provisions of law, have been tabulated, commented upon and published, as usual in the Rhode Island Registration Reports.

The order in which the tables, comprising the events of 1878 are presented, is the same as found in previous Registration Reports, and the tables of comparative results nearly the same.

A new table may be found on page 51 of the Registration Report, (page 62 of this Report,) showing the number of births, marriages and deaths in each town in the State, during each of the four years, 1875 to 1878, inclusive, with the aggregates of the same; also the *proportions* of the average annual number of these events to the *population* of each town, computed on the basis of the Census of 1875.

The principal object of this table is to present the comparative immunity or liability, as the case may be, of the inhabitants of the several towns, to fatal diseases and causes of death. The other events are brought in, because of their intimate relation to mortuary events, and will be of interest to the average reader. It is not to be understood that these comparisons are more than approximately true, the limitations connected with the number of persons in the different periods of life, having nearly as much to do with the relative mortality, as the salubrity or insalubrity of the locality.

There are a large number of synopses and summaries in the Registration Report, which present the events comprised in Vital Statistics, in a great variety of comparisons with each other, with different periods of time, and with various sections of the State, that are as equally, if not more indispensable, in sanitary investigation, than the results of a single year. For these reasons, and for the reason that such reports usually have a place in the Annual Reports of State and city Boards of Health, and for the further reason that the additional expense will be scarcely more than the cost of the paper on which it is printed, an abridged copy of the Twenty-sixth Registration Report of Rhode Island will be found in the following pages.

VITAL STATISTICS.

BIRTHS, MARRIAGES AND DEATHS,

IN

RHODE ISLAND,

FOR THE

YEAR ENDING DECEMBER 31, 1878.

[illegible]

TABLE II.—BIRTHS, 1878.

Arranged by Months, Sexes, and Divisions of the State.

MONTHS.	SEX.	DIVISIONS OF THE STATE.							
		Whole State.	Bristol County.	Kent County.	Newport County, Towns.	Newport City.	Providence County, Towns.	Providence City.	Washington County.
January....	Males....	293	14	10	7	14	109	127	12
	Females..	236	13	11	3	15	88	88	18
	Total....	529	27	21	10	29	197	215	35
February...	Males....	256	9	18	8	16	90	98	17
	Females..	256	13	21	4	24	81	91	22
	Total....	512	22	39	12	40	171	189	39
March	Males....	288	12	24	7	16	108	106	15
	Females..	293	12	18	4	19	101	117	22
	Total....	581	24	42	11	35	209	223	37
April	Males....	272	6	21	6	17	86	121	15
	Females..	233	5	12	1	14	83	101	17
	Total....	505	11	33	7	31	169	222	32
May	Males....	262	12	19	5	24	89	97	16
	Females..	275	11	30	5	19	94	95	21
	Total....	537	23	49	10	43	183	192	37
June	Males....	244	12	20	3	16	79	102	12
	Females..	279	11	20	6	16	100	102	24
	Total....	523	23	40	9	32	179	204	36
July	Males....	275	13	21	7	17	92	109	16
	Females..	279	7	15	5	27	106	99	20
	Total....	554	20	36	12	44	198	208	36

TABLE II.—BIRTHS, 1878.—Continued.

MONTHS.	SEX.	DIVISIONS OF THE STATE.							
		Whole State.	Bristol County.	Kent County.	Newport County, Towns.	Newport City.	Providence County, Towns.	Providence City.	Washington County.
August....	Males....	285	16	29	6	14	86	114	20
	Females..	304	12	17	13	29	95	117	21
	Total....	589	28	46	19	43	181	231	41
September..	Males....	320	10	22	9	18	115	126	20
	Females..	268	5	15	9	17	96	106	20
	Total....	588	15	37	18	35	211	232	40
October....	Males....	284	12	14	8	21	99	109	21
	Females..	294	8	17	9	26	108	106	20
	Total....	578	20	31	17	47	207	215	41
November..	Males....	304	15	25	6	22	104	115	17
	Females..	307	10	14	6	23	107	120	27
	Total....	611	25	39	12	45	211	235	44
December..	Males....	319	10	23	13	28	110	111	24
	Females..	288	10	14	7	24	97	108	28
	Total....	607	20	37	20	52	207	219	52
Whole Year.	Males....	3,402	141	246	85	223	1,167	1,335	205
	Females..	3,312	117	204	72	253	1,156	1,250	260
	Total....	6,714	258	450	157	476	2,323	2,585	465

TABLE III.—MARRIAGES, 1878.

Arranged by Months and Divisions of the State.

MONTHS.	Whole State, 1878.	DIVISIONS OF THE STATE.							Whole State, 1877.
		Bristol County.	Kent County.	Newport County, Towns.	Newport City.	Providence County, Towns.	Providence City.	Washington County.	
January.....	197	12	17	4	13	60	76	15	173
February.....	160	3	10	1	11	39	74	22	148
March.....	159	5	13	2	8	46	73	12	116
First Quarter.....	516	20	40	7	32	145	223	49	437
April.....	169	3	18	2	7	46	76	17	206
May.....	192	11	13	5	12	62	68	21	183
June.....	208	8	14	4	5	56	104	17	193
Second Quarter.....	569	22	45	11	24	164	248	55	582
July.....	197	9	12	1	14	59	94	8	176
August.....	152	5	8	....	11	51	62	15	186
September.....	208	8	13	1	15	60	93	18	214
Third Quarter.....	557	22	33	2	40	170	249	41	576
October.....	236	18	12	1	17	72	99	17	214
November.....	258	10	12	10	9	79	115	23	254
December.....	182	12	4	4	5	53	82	22	219
Fourth Quarter.....	676	40	28	15	31	204	296	62	687
Whole Year.....	2,318	104	146	35	127	683	1,016	207	2,282

TABLE IV.—DEATHS, 1878.

Arranged by Months, Sexes, and Divisions of the State.

MONTHS.	SEX.	Whole State.	DIVISIONS OF THE STATE.						
			Bristol County.	Kent County.	Newport County, Towns.	Newport City.	Providence County, Towns.	Providence City.	Washington County.
January....	Males....	186	6	15	2	7	50	98	8
	Females..	214	8	13	1	12	59	110	11
	Total....	400	14	28	3	19	109	208	19
February...	Males...	173	7	9	3	9	53	84	8
	Females..	189	9	12	2	13	52	91	10
	Total....	362	16	21	5	22	105	175	18
March.....	Males....	192	10	9	4	15	75	74	5
	Females..	204	9	12	5	11	71	84	12
	Total....	396	19	21	9	26	146	158	17
April.....	Males....	176	6	8	3	9	51	88	11
	Females..	174	9	7	1	9	61	76	11
	Total....	350	15	15	4	18	112	164	22
May.....	Males....	159	6	15	1	8	54	65	10
	Females..	149	6	5	2	4	51	66	15
	Total....	308	12	20	3	12	105	131	25
June.....	Males....	144	4	12	5	9	53	52	9
	Females..	166	12	12	3	9	43	76	11
	Total....	310	16	24	8	18	96	128	20
July.....	Males....	224	11	10	4	9	68	111	11
	Females..	186	5	14	3	11	51	92	10
	Total....	410	16	24	7	20	119	203	21
August.....	Males....	205	10	14	4	9	73	83	12
	Females..	215	7	12	3	13	80	92	8
	Total....	420	17	26	7	22	153	175	20
September..	Males....	167	5	11	3	8	60	70	10
	Females..	178	13	16	4	6	58	72	9
	Total....	345	18	27	7	14	118	142	19
October.....	Males....	152	9	9	1	4	38	78	13
	Females..	190	9	12	3	9	60	82	15
	Total....	342	18	21	4	13	98	160	28
November..	Males....	182	5	11	7	8	56	84	11
	Females..	195	10	20	4	6	65	81	9
	Total....	377	15	31	11	14	121	165	20
December..	Males....	201	8	12	4	16	62	82	17
	Females..	220	9	18	4	9	67	98	15
	Total....	421	17	30	8	25	129	180	32
Whole Year.	Males....	2,161	87	135	41	111	693	969	125
	Females..	2,280	106	153	35	112	718	1,020	136
	Total....	4,441	193	288	76	223	1,411	1,989	261

TABLE V.—DEATHS, 1878.

Showing the Number of each Sex, in each Period of Life, in every Town and Division of the State; also the Ratio of Deaths to Population.

TOWNS AND DIVISIONS OF THE STATE.	POPULATION, 1875.			DEATHS, 1878.				
	Whole Number.	SEX.		Per cent. to Population.	Whole Number.	SEX.	Under 1 year.	1 and under 2. 2 and under 3.
Barrington.....	1,185	Males...	572	1.94	23	7	1	1
		Females.	613			16	1	1
Bristol.....	5,829	Males...	2,747	1.46	85	42	3	2
		Females.	3,082			43	6	3
Warren.....	4,005	Males...	1,823	2.12	85	38	5	4
		Females.	2,183			47	4	4
BRISTOL COUNTY...	11,019	Males...	5,142	1.75	193	87	8	7
		Females.	5,877			106	11	8
Coventry.....	4,580	Males...	2,173	1.75	80	42	6	1
		Females.	2,407			38	5	1
East Greenwich.....	3,120	Males...	1,508	1.28	40	17	2	2
		Females.	1,612			23	4	1
West Greenwich.....	1,034	Males...	516	1.55	16	9	2	2
		Females.	518			7	1	1
Warwick.....	11,614	Males...	5,683	1.31	152	67	12	3
		Females.	5,931			85	13	10
KENT COUNTY.....	20,348	Males...	9,880	1.42	288	135	22	8
		Females.	10,468			153	23	12
Jamestown.....	488	Males...	260	0.82	4	3		
		Females.	228			1		
Little Compton.....	1,156	Males...	556	1.04	12	4		1
		Females.	600			8		
Middletown.....	1,074	Males...	542	1.21	13	6	3	1
		Females.	532			7		
New Shoreham.....	1,147	Males...	612	0.79	9	7		
		Females.	535			2		1
Portsmouth.....	1,393	Males...	988	1.06	20	11	2	
		Females.	905			9		1
Tiverton.....	2,101	Males...	1,078	0.86	18	10		
		Females.	1,023			8	1	
TOWNS, NEWPORT Co.	7,859	Males...	4,036	0.97	76	41	5	1
		Females.	3,823			35	1	2
NEWPORT CITY.....	14,028	Males...	6,570	1.59	223	111	16	7
		Females.	7,458			112	8	7

TABLE V.—DEATHS, 1878.—Continued.

3 and under 4.	4 and under 5.	5 and under 10.	10 and under 15.	15 and under 20.	20 and under 30.	30 and under 40.	40 and under 50.	50 and under 60.	60 and under 70.	70 and under 80.	80 and under 90.	90 and over.	Not stated.
.....	.....	1	3	2	.....	2	2	1	2	.....	.....	.....	1
.....	.....	1	1	2	4	3	5	2	3	7	2	.....	.....
1	1	2	.....	1	4	2	3	5	3	6	2	1	.....
2	.....	5	1	3	5	1	.....	2	1	.....	4	.....	1
3	1	4	3	1	4	4	4	4	3	2	1	2	.....
3	1	6	2	5	9	4	5	5	6	9	6	.....	2
4	1	7	6	4	8	8	9	10	6	9	5	3	.....
5	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....
1	1	2	1	1	3	1	1	4	8	8	2	.....	.....
1	.....	2	.....	2	4	6	3	.....	1	5	5	.....	.....
.....	.....	.....	.....	.....	2	.....	1	3	2	4	1	.....	.....
.....	.....	.....	.....	1	1	2	1	2	3	4	4	.....	.....
.....	.....	.....	.....	1	.....	2	.....	.....	1	.....	1	.....	.....
1	.....	1	1	.....	.....	.....	.....	.....	.....	2	.....	.....	.....
3	.....	3	2	3	5	7	2	5	9	2	4	.....	.....
4	4	8	1	4	7	2	5	9	8	4	3	1	.....
4	1	5	3	5	10	10	4	12	20	14	8	.....	.....
6	4	11	2	7	12	10	9	11	12	15	12	1	.....
.....	.....	.....	.....	.....	.....	1	.....	.....	1	1	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....
.....	.....	1	.....	.....	1	2	.....	1	.....	.....	2	.....	.....
.....	1	.....	.....	.....	.....	.....	.....	.....	1	1	2	.....	.....
.....	.....	.....	2	.....	1	.....	.....	.....	1	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	4	1	1	1	.....	.....
.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....
1	.....	1	.....	.....	.....	1	.....	.....	2	4	1	.....	.....
1	.....	1	.....	.....	1	.....	1	.....	.....	3	1	.....	.....
.....	.....	.....	.....	1	.....	.....	.....	1	2	2	3	.....	.....
.....	.....	.....	.....	.....	2	.....	.....	.....	.....	3	2	.....	.....
1	1	1	.....	1	.....	2	.....	6	7	8	7	.....	.....
1	.....	2	2	.....	3	4	2	.....	4	8	6	.....	.....
.....
3	4	9	4	3	12	3	12	6	13	6	6	2	1
1	.....	12	3	6	5	12	7	6	10	14	11	3	1

TABLE V.—DEATHS, 1878.—Continued.

TOWNS AND DIVISIONS OF THE STATE.	POPULATION, 1875.		DEATHS, 1878.			Under 1 year. 1 and under 2. 2 and under 3.		
	Whole Number.	SEX.	Per cent to Population.	Whole Number.	SEX.			
Burrillville.....	5,249	Males... Females.	2,628 2,621	1.26	66	33 33	3 5	1 1
Cranston.....	5,688	Males... Females.	3,046 2,642	1.55	88	51 37	6 6	4 ..
Cumberland.....	5,673	Males... Females.	2,793 2,880	1.53	87	49 38	9 6	5 3
East Providence..	4,336	Males... Females.	2,257 2,079	2.07	90	37 53	3 7	3 3
Foster.....	1,543	Males... Females.	788 755	1.04	16	5 11	.. 1	....
Glocester.....	2,098	Males... Females.	1,086 1,012	1.81	38	25 13	4 ..	1 ..
Johnston.....	4,999	Males... Females.	2,522 2,477	0.92	46	24 22	6 3	1 5
Lincoln.....	11,565	Males... Females.	5,563 6,002	1.80	208	106 102	18 14	9 12
North Providence.	1,303	Males... Females.	620 683	1.07	14	10 4	3 1	1 ..
North Smithfield.	2,797	Males... Females.	1,350 1,447	1.36	38	21 17	2 1	2 1
Pawtucket.....	18,464	Males... Females.	8,866 9,598	1.80	332	148 184	30 30	19 14
Scituate.....	4,101	Males... Females.	2,006 2,095	1.73	71	29 42	.. 7	3 1
Smithfield.....	2,857	Males... Females.	1,358 1,499	1.05	30	14 16	2 2	1 3
Woonsocket....	13,576	Males... Females.	6,362 7,214	2.11	287	141 146	43 36	15 13
TOWNS, PROV. CO.	84,249	Males... Females.	41,245 43,004	1.67	1,411	693 718	129 119	65 56
PROVIDENCE CITY	100,675	Males... Females.	48,701 51,974	1.97	1,989	969 1,020	220 153	83 91
Charlestown.....	1,054	Males... Females.	534 520	1.42	15	5 10	1 ..	.. 1
Exeter.....	1,355	Males... Females.	702 653	1.26	17	8 9	.. 1	....
Hopkinton.....	2,760	Males... Females.	1,344 1,416	1.70	47	20 27	2 4	1 1
North Kingstown.	3,505	Males... Females.	1,705 1,800	1.63	57	32 25	3 2	....
South Kingstown.	4,240	Males... Females.	2,111 2,129	1.11	47	23 24	.. 3	1 ..
Richmond.....	1,739	Males... Females.	845 894	1.72	30	12 18	.. 2	2 ..
Westerly.....	5,408	Males... Females.	2,745 2,663	0.89	48	25 23	6 1	.. 3
WASHINGTON CO.	20,061	Males... Females.	9,986 10,075	1.30	261	125 136	12 13	4 5

TABLE V.—DEATHS, 1878.—Continued.

3 and under 4.	4 and under 5.	5 and under 10.	10 and under 15.	15 and under 20.	20 and under 30.	30 and under 40.	40 and under 50.	50 and under 60.	60 and under 70.	70 and under 80.	80 and under 90.	90 and over.	Not stated.
....	....	3	3	1	6	2	1	4	4	3	1	1	....
1	....	3	3	3	3	6	3	....	1	1	2	1	....
....	3	2	1	....	7	10	4	3	4	2	4	....	....
....	....	1	1	....	3	4	2	4	2	9	4	....	....
....	....	3	1	1	2	7	4	5	2	5	1	....	....
1	1	5	2	1	1	2	1	2	4	3	2	....	....
1	4	2	2	....	1	3	1	6	3	3	1	....	....
3	1	4	2	1	4	8	3	4	6	3	2	....	....
....	....	....	....	....	2	....	....	2	....	....	1	....	....
....	....	....	....	....	1	1	....	2	2	3	1	....	....
....	1	....	1	....	1	4	2	3	4	2	2	....	....
....	....	....	....	1	....	1	....	3	1	3	4	....	....
....	....	....	....	2	....	2	1	2	1	5	1	....	....
2	....	2	....	....	2	2	1	2	1	2	....	....	....
10	5	5	3	6	5	3	5	11	8	10	5	....	....
3	....	9	5	3	9	4	4	12	5	5	6	....	....
1	....	....	....	1	1	1	....	....	....	1	1	....	....
1	....	1	....	1	....	....	....	....	....	....	....	....	....
....	1	1	....	1	3	....	1	1	3	4	1	....	....
....	....	....	....	4	4	....	....	2	....	2	2	1	....
6	5	6	2	1	13	4	14	11	11	13	6	....	2
5	....	8	1	7	28	12	15	15	12	11	16	....	1
....	....	1	....	2	5	1	2	2	1	4	5	1	....
1	....	5	....	2	5	4	....	3	2	7	2	1	1
....	....	....	....	....	1	....	2	....	3	2	1	....	....
....	....	2	....	....	....	....	2	3	2	1	....	....	....
3	....	4	2	4	12	6	7	13	8	12	7	2	....
1	1	6	4	11	18	11	14	5	10	9	2	....	....
21	19	27	15	19	61	42	44	63	52	66	37	4	2
18	3	46	18	34	78	55	45	57	48	59	43	3	2
37	35	70	28	19	78	63	59	75	73	54	20	5	....
36	35	68	24	44	91	99	70	70	53	87	33	10	....
....	....	1	....	....	1	....	1	....	1	....	....	....	....
....	....	....	....	1	1	....	2	....	2	2	....	1	....
1	....	1	....	....	....	1	1	....	1	3	....	....	....
....	....	1	....	....	....	1	1	2	1	....	2	....	....
....	1	1	1	....	4	1	1	1	2	4	....	....	....
....	....	....	2	3	2	2	4	2	2	1	....	3	....
....	....	2	1	....	3	3	5	1	6	5	1	....	....
....	....	3	1	1	5	1	....	4	3	5	....	....	....
....	....	1	....	2	....	3	2	2	3	5	3	....	....
....	1	....	1	1	4	1	....	1	5	3	3	1	....
1	....	....	1	....	1	....	....	....	1	3	3	....	....
....	....	....	....	....	1	3	....	2	1	2	6	1	....
....	....	2	....	....	3	3	....	3	4	1	2	....	....
....	1	1	1	1	3	....	2	2	1	1	5	1	....
2	1	8	3	2	12	11	10	7	18	21	9	....	....
....	2	5	5	7	16	8	9	13	15	14	16	7	....

TABLE V.—DEATHS, 1878.—RECAPITULATION BY COUNTIES.

COUNTIES.	POPULATION, 1875.		DEATHS, 1878.			Under 1 year.	1 and under 2.	2 and under 3.
	Whole Number.	SEX.	Per cent. to Population.	Whole Number.	SEX.			
BRISTOL Co..	11,019	Males..	1.75	193	87	8	7	8
		Females			106	11	8	6
KENT Co....	20,348	Males..	1.42	288	135	22	8	9
		Females			153	23	12	6
NEWPORT Co.	21,887	Males..	1.37	299	152	21	8	5
		Females			147	9	9	6
PROV. Co. . .	184,924	Males..	1.83	3,400	1,662	349	148	77
		Females			1,738	272	147	90
WASH. Co....	20,061	Males..	1.30	261	125	12	4	5
		Females			136	13	5	1
WHOLE STATE.	258,239	Males..	1.72	4,441	2,161	412	175	104
		Females			2,280	328	181	109

TABLE V.—DEATHS, 1878.—RECAPITULATION BY COUNTIES.

3 and under 4.	4 and under 5.	5 and under 10.	10 and under 15.	15 and under 20.	20 and under 30.	30 and under 40.	40 and under 50.	50 and under 60.	60 and under 70.	70 and under 80.	80 and under 90.	90 and over.	Not stated.
4	1	6	2	5	9	4	5	5	6	9	6	....	2
5	1	7	6	4	8	8	9	10	6	9	5	3	....
4	1	5	3	5	10	10	4	12	20	14	8	....	....
6	4	11	2	7	12	10	9	11	12	15	12	1	....
4	5	10	4	4	12	5	12	12	20	14	13	2	1
2	....	14	5	6	8	16	9	6	14	22	17	3	1
58	54	97	43	38	139	105	103	138	125	120	57	9	2
54	38	114	42	78	169	154	115	127	101	146	76	13	2
2	1	8	3	2	12	11	10	7	18	21	9	....	....
....	2	5	5	7	16	8	9	13	15	14	16	7	....
72	62	126	55	54	182	135	134	174	189	178	93	11	5
67	45	151	60	102	213	196	151	167	148	206	126	27	3

TABLE VI.—CAUSES OF DEATH, 1878.

Arranged Alphabetically ; showing the Number of each Sex, who died from each cause, in each Month and in the whole year 1878; also the Number of American and of Foreign Parentage, from each cause, for the year.

CAUSES OF DEATH.	PARENTAGE.			Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	SEX.	
	Am.	For.	Total.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
				Total.		Total.		Total.		Total.		Total.		Total.		Total.	
Accidents (various).....	14	27	41	6	2	4	2	1	1	3	3	2	2	1	2	1	3
“ Burns and Scalds.....	6	5	11	1	1	2	2	1	2	1	1	1	1	1	1	1	4
“ Drowning.....	16	28	44	5	2	1	2	4	8	1	5	1	1	1	2	1	35
“ Falls.....	6	7	13	2	1	1	1	1	1	3	1	1	1	1	1	2	8
“ Poisoning.....	5	1	6	2	1	1	1	1	1	1	1	1	1	1	1	5	1
“ Railroad.....	3	4	7	1	1	1	1	1	1	1	1	2	1	1	1	8	5
Abscesses.....	6	7	13	1	2	1	1	1	1	1	1	2	1	1	1	1	7
Anæmia.....	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	8	5
Anæmia.....	2	4	6	1	1	1	1	1	1	1	1	1	1	1	1	2	2
Anæmia.....	79	23	102	7	3	3	6	8	4	4	3	8	5	4	2	4	6
Apoplexy.....	4	4	8	1	1	1	1	2	1	2	2	1	2	4	4	59	43
Asthma.....	2	2	4	2	1	1	1	1	2	1	2	1	1	1	1	3	5
Bladder, Disease of.....	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	2	2
“ Gravel and Calculus.....	1	3	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Bowels, Disease of.....	25	13	38	2	2	2	3	1	2	3	5	2	1	1	1	2	2
Brain, Disease of.....	12	8	20	1	1	1	1	1	2	2	2	2	2	3	4	26	12
“ Congestion of.....	36	45	81	3	4	5	5	1	4	6	5	6	1	2	1	7	13
“ Inflammation of.....	37	43	80	3	7	4	8	6	4	3	5	6	1	2	2	42	39
Bronchitis.....	52	23	75	3	4	1	3	4	5	1	3	2	4	1	4	30	50
Cancer (various).....	6	5	11	1	1	1	1	1	2	2	2	3	5	3	4	28	47
“ of Breast.....	10	5	15	1	1	1	1	1	1	2	2	2	2	1	1	10	5
“ of Stomach.....																11	15

CAUSES OF DEATH.	PERCENTAGE.												SEX.					
	Am.		Total.										M.		F.			
	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	M.	F.	Total.			
Cancer of Uterus.....	11	7	18	2	1	1	1	2	1	4	2	2	1	1	2	2	18	18
Cancrum Oris.....	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Chicken Pox.....	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Child-birth.....	6	9	15	1	1	2	1	1	2	1	2	2	3	1	2	2	15	15
“ Puerperal Convulsions.	8	3	11	1	2	1	1	5	1	1	1	2	1	1	1	1	11	11
“ Puerperal Fever.....	9	8	17	2	4	2	1	1	2	3	2	2	2	2	2	2	17	17
Cholera Infantum.....	73	95	168	1	1	1	1	4	2	3	3	17	8	4	6	2	1	96
“ Morbus.....	1	5	6	1	1	1	1	1	2	3	1	1	1	1	1	4	2	6
Colic.....	7	5	12	1	1	1	1	1	1	1	1	1	1	1	1	2	9	12
Consumption.....	296	380	676	17	43	20	22	30	35	24	26	32	33	29	23	20	26	39
Convulsions.....	46	66	112	5	5	9	5	4	6	3	2	1	2	6	8	4	9	4
Croup.....	43	50	93	6	7	6	6	4	4	5	1	1	7	4	7	7	13	45
Debility.....	28	41	69	2	5	2	2	2	1	5	3	2	2	3	4	3	5	7
“ Birth Premature.....	8	4	12	1	1	1	3	2	1	2	1	1	1	1	1	1	9	3
Diabetes.....	3	1	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3
Diarrhoea.....	19	21	40	1	2	1	1	1	1	5	6	10	3	2	1	3	4	18
“ Chronic.....	7	6	13	2	1	1	1	1	1	1	1	1	1	1	1	1	6	7
Diphtheria.....	201	234	435	29	35	17	13	29	21	21	19	18	9	13	21	8	5	11
Dropsy.....	23	15	38	1	1	1	2	1	2	2	1	1	2	2	4	3	1	1
“ of Chest.....	3	3	6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3
Dysentery.....	21	14	35	1	1	1	1	2	1	1	1	3	4	2	7	4	4	2
“ Typhoid.....	4	1	5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2
Enteritis.....	17	23	40	4	2	4	1	3	1	1	7	2	5	1	1	3	2	2
Epilepsv.....	6	2	8	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1
Erysipelas.....	11	4	15	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1
Exposure to cold.....	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Fever.....	6	4	10	1	1	1	1	1	1	2	1	1	1	1	1	1	5	5

TABLE VI.—CAUSES OF DEATH, 1878.—Continued.

CAUSES OF DEATH.	PARENTAGE.			Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	SEX.																
	Am.	For.	Total.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.															
				M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	Total.														
Fever Bilious.....	2	...	2	...	...	...	...	...	...	...	...	...	...	...	...	1	1	2													
“ Remittent.....	1	...	1	...	...	...	...	1	...	...	...	...	...	...	...	...	1	1													
“ Typhoid.....	65	69	134	3	3	1	3	4	4	5	4	3	10	7	9	16	7	13	9	10	10	6	...	...	...	...	61	73	134		
“ Gastric.....	3	...	3	...	...	...	...	1	...	...	...	...	...	...	...	...	1	1	...	...	...	...	...	...	...	...	1	1	2	3	
Gallstones.....	2	...	2	...	...	...	...	1	...	...	...	...	...	...	...	...	1	1	...	...	...	...	...	...	...	...	1	1	2	2	
Gangrene.....	6	3	9	...	...	...	...	1	...	...	...	...	...	...	...	...	1	1	...	...	...	...	...	...	...	...	3	6	9	9	
Glossitis.....	1	...	1	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	1	1	
Heart, Diseases of.....	107	54	161	10	1	7	5	6	9	8	5	6	6	10	7	4	5	6	3	9	4	...	7	9	12	12	10	...	87	74	161	
“ Hypertrophy of.....	2	3	5	...	...	...	...	1	...	...	...	...	...	...	...	...	1	...	2	...	...	...	...	...	...	...	...	1	4	5	5
Heat.....	2	2	4	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	4	...	4	4
Hemorrhage.....	5	10	15	1	...	...	...	1	1	...	...	...	...	2	2	1	1	...	3	...	...	...	...	...	...	...	1	3	12	15	
“ from Lungs.....	4	5	9	...	...	...	...	...	...	...	...	...	...	1	2	...	...	...	...	...	...	...	...	...	...	...	...	1	3	6	9
“ from Stomach.....	1	1	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	2	2
Hernia.....	4	3	7	...	...	...	...	...	...	...	...	...	...	...	...	...	1	2	...	...	...	...	...	...	...	...	...	2	5	7	7
Hip-Joint, Disease of.....	2	1	3	3
Hooping Cough.....	30	24	54	2	2	3	2	1	2	1	2	1	1	6	2	3	9	4	3	1	3	1	2	26	28	54
Hydrocephalus.....	34	36	70	2	4	1	2	4	1	5	3	6	4	2	7	3	4	2	3	3	1	1	1	2	1	2	...	39	31	70	70	
Hydrophobia.....	1	2	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	3	...	3	3
Insanity.....	16	6	22	5	17	22	22
Intussusception.....	1	2	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3	1	...	...	...	...	...	...	...	...	2	1	1	3
Intemperance.....	2	9	11	7	4	11	11
“ Delirium Tremens.....	2	1	3	3	...	3	3
“ Opium Eating.....	1	1	2
Jaundice.....	1	...	1

CAUSES OF DEATH.

CAUSES OF DEATH.		Am.	For.	Total.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	Total.
♂	Kidneys, Disease of.....	14	12	26	1	1	1	1	1	1	1	1	1	1	1	1	1	1	26
“	Bright's Disease of.....	35	19	54	4	2	2	1	4	5	3	3	2	1	5	3	3	2	54
	Laryngitis.....	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2
	Lightning Stroke.....	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2
	Liver, Disease of.....	28	12	40	3	1	1	2	2	1	3	1	3	1	2	6	3	1	40
“	Inflammation of.....	1	4	5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	5
	Lungs, Disease of.....	8	7	15	1	1	1	1	3	1	1	1	1	1	1	1	1	1	15
	Malformations, (all kinds)...	17	15	32	3	1	4	4	1	1	1	4	1	2	2	2	1	1	32
	Marasmus.....	21	34	55	1	2	2	2	2	4	2	3	1	1	5	4	4	4	55
	Measles.....	25	56	81	2	10	16	15	9	9	3	2	4	1	1	2	1	1	81
	Meningitis Cerebro-Spinal.....	6	5	11	1	1	1	1	1	1	1	1	2	1	1	1	1	1	11
“	Spinal.....	3	3	3	1	1	1	1	1	1	1	1	2	1	2	1	1	1	3
	Murder and Homicide.....	3	3	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3
	Neuralgia.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Neglect.....	1	2	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3
	Old Age.....	172	50	222	5	9	7	13	8	14	10	16	9	10	5	6	7	10	222
	Paralysis.....	66	20	86	2	7	3	2	7	6	2	4	3	2	4	5	2	8	86
	Peritonitis.....	12	10	22	1	1	1	1	1	3	1	1	1	2	2	1	1	1	22
	Pleurisy.....	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2
	Pneumonia.....	148	121	269	18	23	18	20	22	16	12	16	5	12	3	5	2	7	269
“	Congestion of Lungs.....	28	20	48	3	4	3	5	2	1	3	5	2	1	3	1	1	2	48
	Prostate, Disease of.....	4	4	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	4
	Purpura Hemorrhagica.....	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2
	Pyæmia.....	3	3	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3
	Quinsy.....	9	7	16	2	2	2	2	2	2	2	2	2	2	2	2	2	2	16
	Rheumatism.....	35	51	86	5	1	1	2	2	1	2	1	1	4	6	10	4	1	86
	Scarlatina.....	35	51	86	5	1	1	2	2	1	2	1	1	4	6	10	4	1	86

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TABLE VI.—CAUSES OF DEATH, 1878.—Continued.

CAUSES OF DEATH.	PERCENTAGE.												SEX.																									
	Am.		For.		Total.		Jan.		Feb.		Mar.		Apr.		May.		June.		July.		Aug.		Sept.		Oct.		Nov.		Dec.		M.		F.		Total.			
Scrofula.....	9	4	13	2	1	1	1	1	1	1	1	1	2	1					1					1											5	8	13	
Septicæmia.....	2	1	3	1																			1												2	1	3	
Skin, Disease of.....	4	1	5	1									1																						3	2		
Spleen, Disease of.....	1	1	2																																1			
Spine, Disease of.....	3	4	7	1	1	1	1	1	1	1	1	1	2	1										1										5	2	7		
Stomach, Disease of.....	5	5	10	1	1	1	1	1	1	1	1	1	2	1					1															1	1	10		
“ Inflammation of.....	4	10	14	1	1	1	1	1	1	1	2	2							1																7	7	14	
Suicide.....	12	9	21	2	1	1	1	1	1	1	1	1	1	1					4	1	2	1	1	2	1	3								16	5	21		
Surgical Operations.....	2	1	3																1															1		3	3	
Syphilis.....	2	1	3	2																																1	1	2
“ Congenital.....	1	1	2	1	1	1	1	1	1	1	1	1							1															1	1	2		
Tabes Mesenterica.....	2	4	6																1																4	2	6	
Teething.....	4	12	16	1	1	1	1	1	1	1	2								5															11	5	16		
Tetanus and Tris. Nasen.....	4	4	8	1	1	1	1	1	1	1	1	1	1	1																				6	2	8		
Thrush.....	2	2	4	1	1	1	1	1	1	1	2																							3	1	4		
Tuberculosis.....	13	14	27	1	1	1	1	1	1	1	2								1	2	1	1	1	1	1	1	1	2	2	1	14	13	27					
Tumor.....	11	10	21	1	1	1	1	1	1	2	2								2	1	2	1	1	3										2	19	21		
Ulcer.....	2	2	4																1																2	2		
Uremia.....	1	1	2	1	1	1	1	1	1	1	1	1							1															1		1		
Uterus, Disease of.....	1	1	2																1																1	1	2	
Worms.....	1	1	2	1	1	1	1	1	1	1	1	1																							2			
Unknown.....	77	131	208	6	5	9	11	10	9	11	6	9	3	4	6	14	7	6	14	10	11	7	10	9	9	10	12	105	103	208	2	2	2	2	2	2	208	
“ Sudden.....	2	2	4	1	1	1	1	1	1	1	1	1							1																2		2	

TABLE VII.—CAUSES OF DEATH, 1878.

Arranged Alphabetically; showing the Number of each Sex, who died from each cause, in each Period of Life.

CAUSES OF DEATH.	Under 1.		1 and under 2.		2 to 5.		5 to 10.		10 to 15.		15 to 20.		20 to 30.		30 to 40.		40 to 50.		50 to 60.		60 to 70.		70 to 80.		80 and over.		Age not stated.		SEX.				
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	Total.		
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	Total.		
Accidents (various).....	3	5			2		1	1			2		3	1	5		5	1	4		3		2	2		1				30	11	41	
“ Burns and Scalds.....					3	1	1	1			1				1				1											4	7	11	
“ Drowning.....			1	8	1	6	4	2	2	2			7	2	4	2	2	2		2					1				35	9	44		
“ Falls.....			1	1	1	1	1	1	1	1			1		1		1	1	2	1		1	1		1				8	5	13		
“ Poisoning.....			1										1		1		1				4								5	1	6		
“ Railroad.....													1		1		1				1		1	1		1			7		7		
Abscesses.....	1	1	1	1							1		1	2	1	1		1											8		5	13	
Anæmia.....									1						1																	2	2
Aneurism.....													1	2																	4	2	6
Apoplexy.....							1						1	1	1	1	7	3	12	9	14	7	16	16	8	5		1	59	43	102		
Asthma.....																		1	1	1	1	1	1	1	2			3	5	8			
Bladder, Disease of.....																					2							2			2		
“ Gravel and Calculus.....																							1								1	1	
Bowels, Disease of.....	1																	1		1		1						2			2	4	
Brain, Disease of.....		1	1	1			1	2					1		3	1	2	1	3	2	6	4	4	1	4			26	12		38		
“ Congestion of.....	1	3	2		1	1					3				2	1	2	1	1	2								7	13		20		
“ Inflammation of.....	10	9	5	8	9	4	3	1	2	2	1	1	1	1	3	1	2	3	4	1	1				1			42	39		81		
Bronchitis.....	17	11	2	10	2	3		2	1	1	1	1	1	1	1	1	2		2	1	7	3	5	3	4			30	50		80		
Cancer (various).....		1			1								1		2	5	3	7	6	16	9	7	5	6	2	3		28	47		75		
“ of Breast.....																		3		6											11	11	
“ of Stomach.....																	1	1	1	2	1	6	1	1	1			10			5	15	

TABLE VII.—CAUSES OF DEATH, 1878.—Continued.

CAUSES OF DEATH.	Under 1.		1 and under 2.		2 to 5.		5 to 10.		10 to 15.		15 to 20.		20 to 30.		30 to 40.		40 to 50.		50 to 60.		60 to 70.		70 to 80.		80 and over.		Age not stated.		SEX.		
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	Total.		
Cancer of Uterus.....																	1		4	9	3	1							18	18	
Cancrum Oris.....	1																												1	1	
Chicken Pox.....																														1	1
Child-birth.....												1	6																15	15	
“ Puerperal Convulsions												2	6																11	11	
“ Puerperal Fever.....												1	6																17	17	
Cholera Infantum.....	73	49	17	17	6	6																							96	72	168
“ Morbus.....																													4	2	6
Colic.....	1				1																								9	3	12
Consumption.....	3	6	6	2	2	3	5	3	11	21	48	98	116	54	85	33	45	29	27	18	14	15	3	2				296	380	676	
Convulsions.....	31	25	14	15	14	6	2	2	1		1																	63	49	112	
Croup.....	5	6	12	9	17	23	9	10	2																			45	48	93	
Debility.....	28	28	1	2	1															2	4	2						33	36	69	
“ Birth Premature.....	9	3																										9	3	12	12
Diabetes.....																													1	3	4
Diarrhoea.....	13	9	3	4		1																							22	18	40
“ Chronic.....																													6	7	13
Diphtheria.....	12	6	40	29	104	76	49	75	14	19	1	2																224	211	435	
Dropsy.....	1																												21	17	38
“ of Chest.....																													2	4	6
Dysentery.....	2	2	3	4	2	2	1																						12	23	35
“ Typhoid.....			1										1																2	3	5

CAUSES OF DEATH.

	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	Total.	
Enteritis.....	3	7			3	1	2	1			3	1	2	1	1	1	3	1	3	2			3					16	24	40
Epilepsy.....								1					1				1	2		1							5	3	8	
Erysipelas.....	1	1						1					1	1			2	3		2		1	2				8	7	15	
Exposure to cold.....																											1	...	1	
Fever.....	1						1		1		2				1	1	1	1									5	5	10	
“ Bilious.....															1	1											1	1	1	2
“ Remittent.....															1												...		1	1
“ Typhoid.....															5	4	4	5	6	1	1	1	1	2			61	73	134	
“ Gastric.....																	1										1	2	3	
Gangrene.....	1															2	1					1	2	1			3	6	9	
Gallstones.....																		1									1	1	1	2
Glossitis.....																											1	...		1
Heart, Diseases of.....	2	1			1	1	1	2	5	3	4	4	13	9	7	15	10	20	15	24	10	5	6				87	74	161	
“ Hypertrophy of..													1	1				1			2						1	4	5	
Heat.....								1										1			2						4	...	4	
Hemorrhage.....	1	3																2		1	2						3	12	15	
“ from Lungs.....													1	1			2		1	1	1						3	6	9	
“ from Stomach.....															1			1									2	...	2	
Hernia.....															1			4									2	5	7	
Hip-Joint, Disease of.....																		1									2	1	3	
Hooping Cough.....	17	8	6	9	3	9	2																				26	28	54	
Hydrocephalus.....	14	10	15	8	9	6	1	6			1																39	31	70	
Hydrophobia.....																					1						3	...	3	
Insanity.....													1	2	1	2	1	1	4	1	3		3	2		5	17	22		
Intemperance.....															1	2	1	5									7	4	11	

TABLE VII.—CAUSES OF DEATH, 1878.—Continued.

CAUSES OF DEATH.																														
Under 1.		1 and under 2.		3 to 5.		5 to 10.		10 to 15.		15 to 20.		20 to 30.		30 to 40.		40 to 50.		50 to 60.		60 to 70.		70 to 80.		80 and over.		Age not stated.		SEX.		
M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	Total.
Intemperance, Delir. Tremens																														
" Opium Eating																														
Intussusception																														
Jaundice																														
Kidneys, Disease of																														
" Bright's Disease of.																														
Laryngitis																														
Lightning Stroke																														
Liver, Disease of.																														
" Inflammation of.																														
Lungs, Disease of																														
Malformations, (all kinds)																														
Marasmus																														
Measles																														
Meningitis Cerebro-Spinal.																														
" Spinal																														
Murder and Homicide																														
Neuralgia																														
Neglect																														
Old Age.																														
Paralysis.																														
Peritonitis																														

CAUSES OF DEATH.

CAUSES OF DEATH.	Under 1.		1 and under 2.		2 to 5.		5 to 10.		10 to 15.		15 to 20.		20 to 30.		30 to 40.		40 to 50.		50 to 60.		60 to 70.		70 to 80.		80 and over.		Age not stated.		SEX.		Total.		
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.			
Pleurisy.....																														1	1	2	
Pneumonia.....	24	23	11	10	9	16	3	2	1	2	6	3	3	8	7	9	16	10	10	7	18	20	12	26	5	8			125	144	269		
“ Congestion of Lungs.	7	10	2	2	1	1	3	1			1	1	2	1		2	2	1	1	3	7	1	3	7					18	30	48		
Prostate, Disease of.....																													4	...	4		
Purpura Hemorrhagica.	1																												...	1	1	2	
Pyæmia.....																													...	1	1	2	
Quinsy.....																													1	1	2	3	
Rheumatism.....																													1	2	7	16	
Scarlatina.....	3	4	8	9	14	16	15	11	1	3	1	1	2	2		1	1	1	2	1	1	1	1	1	1			41	45	86			
Scrofula.....	2	1	1	1	1	1	1				2	2				1												5	8	13	3		
Septicæmia.....																													2	1	3	5	
Skin, Disease of.....	1	2	1																										3	2	5	1	
Spleen, Disease of.....																													1	...	1	7	
Spine, Disease of.....	1	1									1	1	1															5	2	8	10		
Stomach, Disease of.....	1																												2	8	7	14	
“ Inflammation of.....																													7	7	14		
Suicide.....																													16	5	21		
Surgical Operations.....																													...	3	3	3	
Syphilis.....																													...	1	1	2	
“ Congenital.....	1	1																											1	1	2		
Tabes Mesenterica.....	2		2	1																									4	2	6	6	
Teething.....	9	2	2	3																									11	5	16		
Tetanus and Tris. Nascen.	5	2																											6	2	8		
Thrush.....	3	1																											3	1	4		
Tuberculosis.....	3	4																											14	13	27		

TABLE VII.—CAUSES OF DEATH, 1878.—Continued.

CAUSES OF DEATH.	Under 1.		1 and under 2.		2 to 5.		5 to 10.		10 to 15.		15 to 20.		20 to 30.		30 to 40.		40 to 50.		50 to 60.		60 to 70.		70 to 80.		80 and over.		Age not stated.		SEX.			
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	Total.	
Tumor.....	1												1		3		4		5		5		2						2	19	21	
Ulcer.....																			1		1									2	2	
Uræmia.....													1																1		1	
Uterus, Disease of.....													1																1	1	1	
Worms.....				2																											2	2
Unknown.....	44	35	6	12	8	10	5	4	2	1	1	4	3	7	2	7	6	4	5	2	7	8	9	3	4	5	3	1	105	103	208	
“ Sudden.....																			1		1								2		2	

TABLE VIII.—CLASSIFICATION AND PERCENTAGE, 1878.

Showing what part of the Mortality in the whole State, and in each Division, is ascribed to each cause, and class of causes.

NUMBER OF DEATHS IN EACH DIVISION OF THE STATE.							PERCENTAGE OF DEATHS IN EACH DIVISION.					
Bristol County.	Kent County.	Newport County, Towns.	Newport City.	Providence County, Towns.	Providence City.	Washington County.	Percentage in the Whole State.	CAUSES OF DEATH.				
193 288	76 223	1,411	1,989 261	4,441	All Causes.....	100.00	100.00	.....	.....	.....	.....	.....
187 249	74 191	1,308	1,973 249	4,231	Specified Causes.....	100.00	100.00	.....	.....	.....	.....	.....
66 83	12 39	354	621	1,222	I. ZYMOTIC DISEASES.....	28.88	18.88	31.48	27.07	20.42	16.22	33.33
					SPORADIC DISEASES.							
13 27	6 16	147	196	433	II. GENERAL OR NOT LOCALIZED	10.23	11.25	9.93	11.24	8.38	8.10	10.84
24 37	17 29	165	258	554	III. NERVOUS SYSTEM.....	13.09	9.63	13.08	12.61	15.18	22.98	14.86
37 56	13 48	375	511	1,118	IV. RESPIRATORY SYSTEM.....	26.42	31.33	25.90	28.67	25.13	17.57	22.49
5 11	6 9	39	87	172	V. CIRCULATORY SYSTEM.....	4.07	6.02	4.41	2.98	4.71	8.10	4.42
13 10	4 13	51	86	187	VI. DIGESTIVE SYSTEM.....	4.42	4.02	4.36	3.90	6.81	5.41	4.02
4 3	1 3	27	51	92	VII. URINARY SYSTEM.....	2.17	1.21	2.58	2.06	1.57	1.35	1.21
2 2	1 1	6	13	27	VIII. GENERATIVE SYSTEM.....	.64	.80	.66	.46	.52	1.35	.80
1 2	1 1	8	12	26	IX. LOCOMOTIVE SYSTEM.....	.62	.40	.61	.61	.52	1.35	.80
.....	2	.....	3	7	X. INTEGUMENTIVE SYSTEM.....	.17	.80	.15	.....	1.05	.....	.....
15 8	9 23	76	61	232	XI. OLD AGE.....	5.25	12.04	3.09	5.81	12.04	12.16	3.21
7 10	4 7	60	74	171	XII. EXTERNAL CAUSES.....	4.04	3.62	3.75	4.59	3.67	5.41	4.02

1	1	1	1	1	7	11	26	36	08	52	.....	40	54
3	5	3	1	1	1	2	05	05	08	.....	.....	.....	.....
14	57	4	1	1	4	86	2.03	2.89	1.07	.....	4.05	2.01	1.60
1	2	1	1	1	2	3	07	10	08	.....	.....	.....	.....
2	1	1	1	1	1	4	09	05	15	.....	.....	40	.....
66	83	12	39	354	621	Totals	28.88	18.88	31.48	27.07	16.22	33.33	35.29
II. GENERAL OR NOT LOCALIZED.													
2	2	.....	.....	3	6	13	31	30	23	.....	.....	80	1.07
5	11	2	6	37	48	2	05	.....	08	52	.....	.....	.....
119	119	10	10	37	48	119	2.82	4.02	2.83	3.14	2.70	4.42	2.67
1	1	.....	.....	1	.....	1	02	.....	.....	52	.....	.....	.....
81	36	3	3	38	36	81	1.91	1.21	2.91	1.57	.....	40	.....
38	11	11	11	18	11	38	0.90	4.42	1.38	52	2.70	2.01	54
9	2	1	2	4	2	9	21	40	30	.....	1.35	40	.....
17	8	8	8	8	8	17	40	.....	61	.....	.....	40	.....
32	22	22	22	7	22	32	76	1.12	53	52	1.35	40	.....
55	39	1	39	10	39	55	1.30	40	77	1.05	.....	.....	1.60
1	1	.....	.....	1	.....	1	02	.....	08	.....	.....	.....	.....
13	7	1	7	4	7	13	31	40	30	52	.....	.....	.....
4	1	.....	.....	3	1	4	09	05	23	.....	.....	.....	.....
27	17	17	17	6	17	27	64	86	46	.....	.....	1.61	.....
21	10	1	10	7	10	21	50	40	53	.....	.....	40	1.07
433	196	28	433	147	196	Totals	10.23	11.25	9.93	11.24	8.10	10.84	6.95
III. NERVOUS SYSTEM.													
102	42	11	102	31	42	102	2.41	4.42	2.13	2.37	6.76	2.41	1.07
20	7	1	20	9	7	20	47	40	36	68	52	80	.....
38	16	16	38	17	16	38	90	.....	81	1.30	1.35	1.21	.....

TABLE VIII.—CLASSIFICATION AND PERCENTAGE, 1878.—Continued.

NUMBER OF DEATHS IN EACH DIVISION OF THE STATE.							PERCENTAGE OF DEATHS IN EACH DIVISION.								
CAUSES OF DEATH.															
Bristol County.	Kent County.	Newport Towns.	Newport City.	Providence County, Towns.	Providence City.	Washington County.	Percentage in the Whole State.	Washington County.	Providence City.	Providence County, Towns.	Newport City.	Newport County, Towns.	Kent County.	Bristol County.	
1	7	1	7	19	45	1	81	Brain, Inflammation of	.40	2.28	1.45	3.67	1.35	2.81	.54
5	6	3	3	33	58	4	112	Convulsions	1.61	2.94	2.52	1.57	4.05	2.41	2.67
				1	2		3	Delirium Tremens	.07	.10	.08				
				1	6	1	8	Epilepsy	.40	.30	.08				
6	2		3	20	39		70	Hydrocephalus	.19	1.98	1.53	1.57	.80	3.21	
			1	3	17	1	22	Insanity	.40	.86	.23	.52			
	1		1			1	3	Meningitis, Spinal	.40			.52	.40		
				1			1	Neuralgia	.07		.08				
10	10	5	6	27	24	4	86	Paralysis	1.61	1.22	2.06	3.14	6.76	4.02	5.35
		2	1	3	2		8	Tetanus and Tris. Nascetium	.19	.10	.23	.52	2.70		
24	37	17	29	165	258	24	554	Totals	9.63	13.08	12.61	15.18	22.98	14.86	12.84
IV. RESPIRATORY SYSTEM.															
	2			2	3	1	8	Asthma	.40	.15	.15			.80	
1	2		6	22	48	1	80	Bronchitis	.40	2.43	1.68	3.14		.80	.54
23	41	10	21	229	305	4	676	Consumption	18.88	15.46	17.51	10.99	13.51	16.47	12.30
3		1	1	1		1	6	Dropsy of Chest	.40		.08	.52			1.60

9 Hemorrhage from Lungs.....	21	.....	30	.....	1.05	.....	.....	.....	.....
2 Laryngitis.....	.05	.....	.05	.....	.08	.....	.....	.....	.....
15 Lungs, Diseases of.....	.35	.....	.36	.....	.61	.....	.....	.....	.....
2 Pleurisy.....	.05	.....	.05	.....	.08	.....	.....	.....	.....
269 Pneumonia.....	6.36	9.63	5.98	7.19	6.28	2.70	4.42	4.28	.....
48 " Congestion of Lungs...	1.13	1.61	1.12	1.22	1.57	1.35	.....	1.07	.....
3 Quinsy.....	.07	.....	.....	.....	1.57	.....	.....	.....	.....
Totals.....	26.42	31.33	25.90	28.67	25.13	17.57	22.49	19.79	.....
V. CIRCULATORY SYSTEM.									
6 Aneurism.....	.14	.40	.20	.08	.....	.....	.....	.....	.....
166 Heart, Diseases of.....	3.92	5.62	4.21	2.91	4.71	8.10	4.42	2.67	.....
Totals.....	4.07	6.02	4.41	2.98	4.71	8.10	4.42	2.67	.....
VI. DIGESTIVE SYSTEM.									
4 Bowels, Diseases of.....	.09	.....	.....	.23	.52	.....	.....	.....	.....
12 Colic.....	.28	1.21	.10	.30	.....	.....	.80	.54	.....
1 Glossitis.....	.02	.....	.....	.....	.....	.....	.40	.....	.....
40 Enteritis.....	.95	.40	.91	.77	2.09	.....	1.61	1.60	.....
2 Gallstones.....	.05	.....	.05	.....	.....	.....	.....	.54	.....
7 Hernia.....	.17	Hernia.....	.25	.15	.....	.....	.....	.....	.....
3 Intussusception.....	.07	.....	.10	.08	.....	.....	.....	.....	.....
2 Jaundice.....	.05	.....	.....	.....	1.05	.....	.....	.....	.....
45 Liver, Diseases of.....	1.06	.80	.86	1.07	.52	4.05	.40	3.74	.....
22 Peritonitis.....	.52	.80	.81	.23	.52	.....	.....	.....	.....
1 Spleen, Diseases of.....	.02	.....	.05	.....	.....	.....	.....	.....	.....
24 Stomach, Diseases of.....	.57	.40	.71	.46	1.05	.....	.40	.....	.....
6 Tabes Mesenterica.....	.14	.....	.20	.15	.....	.....	.....	.....	.....

TABLE VIII.—CLASSIFICATION AND PERCENTAGE, 1878.—Continued.

NUMBER OF DEATHS IN EACH DIVISION OF THE STATE.							CAUSES OF DEATH.							PERCENTAGE OF DEATHS IN EACH DIVISION.						
Bristol County.	Kent County.	Newport County.	Newport City.	Providence County.	Providence City.	Washington County.	Whole State.	Percentage in the Whole State.	Washington County.	Providence City.	Providence County.	Newport City.	Newport County, Towns.	Kent County.	Bristol County.					
1	1	1	1	6	6	1	16	Teething.....	.38	.40	.30	.46	.52	1.35	.40	.54				
1	1	1	1	1	1	1	2	Worms.....	.05	.05	.05	.05	.05	.05	.40	.05				
13	10	4	13	51	86	10	187	Totals.....	4.42	4.02	4.36	3.90	6.81	5.41	4.02	6.95				
VII. URINARY SYSTEM.																				
				1	2		3	Bladder, Diseases of.....	.07	.07	.10	.08								
				1	2	1	4	Diabetes.....	.09	.40	.10	.08								
4	3	1	2	21	47	2	80	Kidneys, Diseases of.....	1.89	.80	2.38	1.61	1.05	1.35	1.21	2.14				
				4			4	Prostate, Diseases of.....	.09	.09	.09	.30								
			1				1	Uremia.....	.02				.52							
4	3	1	3	27	51	3	92	Totals.....	2.17	1.21	2.58	2.06	1.57	1.35	1.21	2.14				
VIII. GENERATIVE SYSTEM.																				
							15	Child-birth.....	.35	.80	.41	.23	.52		.40					
2	1	1	1	3	4		11	" Puerperal Convulsions.	.26		.20	.23		1.35	.40	1.07				

TABLE IX.—OCCUPATIONS AND AGES AT DEATH, 1878.

Showing the Average Age, at Death, in the several occupations; Providence City being separated from the rest of the State; and ages under twenty being excluded.

OCCUPATIONS.	WHOLE STATE.			PROVIDENCE CITY.			REST OF STATE.		
	Number who Died.	Aggregate Age.	Average Age.	Number who Died.	Aggregate Age.	Average Age.	Number who Died.	Aggregate Age.	Average Age.
I. AGRICULTURE.									
Farmers.....	152	9,932	65.34	6	444	74.00	146	9,488	64.98
Gardeners.....	3	192	64.00	1	55	55.00	2	137	68.50
II. PROFESSIONAL AND PERSONAL SERVICES.									
Artists.....	2	93	46.50	.....	.....	.....	2	93	46.50
Author.....	1	48	48.00	.....	.....	.....	1	48	48.00
Barbers.....	4	151	37.75	2	69	34.50	2	82	41.00
Canvasser.....	1	42	42.00	.....	.....	.....	1	42	42.00
Civil Engineers.....	3	141	47.00	.....	.....	.....	3	141	47.00
Clergymen.....	2	138	69.00	2	138	69.00	.....	.....	.....
Clerks and Salesmen	25	792	31.68	18	577	32.06	7	215	30.71
Coachmen.....	2	85	42.50	2	85	42.50	.....	.....	.....
Collector.....	1	47	47.00	1	47	47.00	.....	.....	.....
Constables.....	2	159	79.50	2	159	79.50	.....	.....	.....
Cook.....	1	25	25.00	1	25	25.00	.....	.....	.....
Hostlers.....	2	93	46.50	.....	.....	.....	2	93	46.50
Hotel-keepers.....	3	187	62.33	.....	.....	.....	3	187	62.33
Janitors.....	2	89	44.50	2	89	44.50	.....	.....	.....
Laborers.....	202	10,405	51.51	85	4,387	51.61	117	6,018	51.43
Laundryman (Chinese).....	1	20	20.00	.....	.....	.....	1	20	20.00
Lawyers.....	4	216	54.00	3	167	55.67	1	49	49.00
Musicians.....	2	109	54.50	2	109	54.50	.....	.....	.....
Music-teachers.....	2	123	61.50	1	73	73.00	1	50	50.00
Photographer.....	1	59	59.00	1	59	59.00	.....	.....	.....
Physicians.....	7	405	57.86	2	120	60.00	5	285	57.00
Policemen.....	2	73	36.50	1	31	31.00	1	42	42.00
Reporters.....	2	88	44.00	2	88	44.00	.....	.....	.....
Saloon-keepers.....	2	72	36.00	.....	.....	.....	2	72	36.00
Stable-keepers.....	4	180	45.00	2	73	36.50	2	107	53.50
Student.....	1	20	20.00	1	20	20.00	.....	.....	.....
Teachers.....	2	100	50.00	1	57	57.00	1	43	43.00
Undertaker.....	1	72	72.00	.....	.....	.....	1	72	72.00
Waiters.....	2	93	46.50	2	93	46.50	.....	.....	.....
Watchman.....	1	50	50.00	1	50	50.00	.....	.....	.....

TABLE IX.—OCCUPATIONS, 1878.—Continued.

OCCUPATIONS.	WHOLE STATE.			PROVIDENCE CITY.			REST OF STATE.		
	Number who Died.	Aggregate Age.	Average Age.	Number who Died.	Aggregate Age.	Average Age.	Number who Died.	Aggregate Age.	Average Age.
III. TRADE AND TRANSPORTATION.									
Agents.....	3	143	47.67	2	90	45.00	1	53	53.00
Apothecaries.....	4	209	52.25	2	85	42.50	2	124	62.00
Bankers.....	2	116	58.00	.....	.....	.....	2	116	58.00
Book-keepers.....	13	620	47.69	10	450	45.00	3	170	56.67
Boatmen.....	2	129	64.50	.....	.....	.....	2	129	64.50
Brokers.....	4	237	59.25	4	237	59.25	.....	.....	.....
Butchers.....	5	259	51.80	2	94	47.00	3	165	55.00
Cashiers (Bank, &c.)	3	159	53.00	2	88	44.00	1	71	71.00
Expressmen.....	2	108	54.00	2	108	54.00	.....	.....	.....
Fishermen and Oys- termen.....	3	180	60.00	.....	.....	.....	3	180	60.00
Grocers.....	8	370	46.25	6	231	38.50	2	139	69.50
Hackman.....	1	62	62.00	1	62	62.00	.....	.....	.....
Insurance Agent....	1	25	25.00	.....	.....	.....	1	25	25.00
Liquor Dealers.....	6	252	42.00	6	252	42.00	.....	.....	.....
Mariners.....	26	1,645	63.27	12	696	58.00	14	949	67.79
Marketman.....	1	68	68.00	1	68	68.00	.....	.....	.....
Merchants.....	29	1,864	64.28	15	1,021	68.07	14	843	60.21
Peddlers.....	6	226	37.66	3	119	39.67	3	107	35.67
Pilot.....	1	64	64.00	.....	.....	.....	1	64	64.00
Porter.....	1	38	38.00	1	38	38.00	.....	.....	.....
R. R. Station Agent.	1	32	32.00	.....	.....	.....	1	32	32.00
Ship Chandlers.....	2	134	67.00	2	134	67.00	.....	.....	.....
Teamsters.....	13	664	51.08	6	322	53.66	7	342	48.86
Telegrapher.....	1	22	22.00	1	22	22.00	.....	.....	.....
Traders and Dealers.	7	390	55.71	3	164	54.66	4	226	56.50
IV. MANUFACTURES, MECHANICAL AND MINING INDUSTRIES.									
Bakers.....	7	450	64.28	2	118	59.00	5	332	66.40
Belt-maker.....	1	64	64.00	1	64	64.00	.....	.....	.....
Blacksmiths.....	15	827	55.13	3	131	43.66	12	696	58.00
Bleachers.....	2	115	57.50	2	115	57.50	.....	.....	.....
Block-maker.....	1	74	74.00	1	74	74.00	.....	.....	.....
Boat-builder.....	1	70	70.00	.....	.....	.....	1	70	70.00
Book-binder.....	1	22	22.00	.....	.....	.....	1	22	22.00
Boot and Shoe-makers	13	728	56.00	8	399	49.88	5	329	65.80
Brush-maker.....	1	50	50.00	.....	.....	.....	1	50	50.00
Cabinet-maker.....	1	77	77.00	1	77	77.00	.....	.....	.....

TABLE IX,—OCCUPATIONS, 1878.—Continued.

OCCUPATIONS.	WHOLE STATE.			PROVIDENCE CITY.			REST OF STATE.		
	Number who Died.	Aggregate Age.	Average Age.	Number who Died.	Aggregate Age.	Average Age.	Number who Died.	Aggregate Age.	Average Age.
Calico-printers.....	3	176	58.67	3	176	58.67	.....	.....	.....
Carpenters.....	44	2,442	55.50	24	1,254	52.25	20	1,188	59.40
Cigar-makers.....	3	147	49.00	1	47	47.00	2	100	50.00
Confectioner.....	1	32	32.00	1	32	32.00	.....	.....	.....
Coopers.....	2	166	83.00	1	81	81.00	1	85	85.00
Designer.....	1	59	59.00	1	59	59.00	.....	.....	.....
Die Sinkers.....	2	105	52.50	1	60	60.00	1	45	45.00
Dyer.....	1	47	47.00	1	47	47.00	.....	.....	.....
Engineers.....	10	513	51.30	6	291	48.50	4	222	55.50
Farrier.....	1	67	67.00	.....	.....	.....	1	67	67.00
File-makers.....	2	86	43.00	2	86	43.00	.....	.....	.....
Gas Fitters.....	2	118	59.00	2	118	59.00	.....	.....	.....
Harness-makers.....	4	184	46.00	2	113	56.50	2	71	35.50
Hatters.....	2	88	44.00	1	27	27.00	1	61	61.00
House Mover.....	1	73	73.00	.....	.....	.....	1	73	73.00
Jewelers.....	24	996	41.50	18	781	43.39	6	215	35.83
Machinists.....	30	1,417	47.23	16	722	45.13	14	695	49.64
Manufacturers.....	12	766	63.83	7	443	63.29	5	323	64.60
Masons.....	22	1,381	62.77	9	518	57.56	13	863	66.38
Mechanics.....	16	824	51.50	6	315	52.50	10	509	50.90
Millwright.....	1	86	86.00	.....	.....	.....	1	86	86.00
Miner.....	1	34	34.00	1	34	34.00	.....	.....	.....
Moulders.....	5	240	48.00	4	172	43.00	1	68	68.00
Operatives.....	60	2,406	40.10	12	414	34.50	48	1,992	41.50
Overseers and Superintendents.....	6	297	49.50	1	26	26.00	5	271	54.20
Oyster Opener.....	1	38	38.00	1	38	38.00	.....	.....	.....
Painters.....	18	946	52.44	5	300	60.00	13	646	49.69
Pattern-maker.....	1	26	26.00	.....	.....	.....	1	26	26.00
Paper Hanger.....	1	52	52.00	.....	.....	.....	1	52	52.00
Platers.....	2	88	44.00	2	88	44.00	.....	.....	.....
Plumber.....	1	23	23.00	1	23	23.00	.....	.....	.....
Pork Packer.....	1	55	55.00	1	55	55.00	.....	.....	.....
Printers.....	2	83	41.50	2	83	41.50	.....	.....	.....
Rubber-workers.....	2	68	34.00	.....	.....	.....	2	68	34.00
Sail-maker.....	1	72	72.00	1	72	72.00	.....	.....	.....
Ship Carpenters.....	4	257	64.25	2	137	68.50	2	120	60.00
Silversmiths.....	2	80	40.00	2	80	40.00	.....	.....	.....
Stair Builder.....	1	24	24.00	1	24	24.00	.....	.....	.....
Stone Cutters.....	7	352	50.26	1	51	51.00	6	301	50.17
Stucco-worker.....	1	29	29.00	1	29	29.00	.....	.....	.....
Tailors.....	13	671	51.61	7	404	57.71	6	267	44.50
Tinsmiths.....	4	175	43.75	2	88	44.00	2	87	43.50

TABLE IX.—OCCUPATIONS, 1878.—Continued.

OCCUPATIONS.	WHOLE STATE.			PROVIDENCE CITY.			REST OF STATE.		
	Number who Died.	Aggregate Age.	Average Age.	Number who Died.	Aggregate Age.	Average Age.	Number who Died.	Aggregate Age.	Average Age.
Tool-maker.....	1	51	51.00	...	...	...	1	51	51.00
Umbrella-maker....	1	79	79.00	1	79	79.00	...	...	...
Upholsterers.....	2	63	31.50	...	...	...	2	63	31.50
Watch-maker.....	1	53	53.00	1	53	53.00	...	...	...
Wheelwrights.....	5	356	71.20	2	149	74.50	3	207	69.00
V. FEMALES.									
Actress.....	1	24	24.00	...	...	...	1	24	24.00
Book-binder.....	1	43	43.00	1	43	43.00	...	...	...
Dressmakers and Seamstresses.....	9	274	30.44	8	247	30.88	1	27	27.00
Milliner.....	1	47	47.00	1	47	47.00	...	...	...
Nurse.....	1	40	40.00	...	...	...	1	40	40.00
Operatives.....	22	571	25.95	7	170	24.28	15	401	26.73
Servants.....	5	237	47.40	1	49	49.00	4	188	47.00
Sister of Mercy....	1	32	32.00	1	32	32.00	...	...	...
Tailoresses.....	2	84	42.00	1	28	28.00	1	56	56.00
Teachers.....	6	325	54.17	4	206	51.50	2	119	59.50

TABLE IX.—RECAPITULATION BY CLASSES.

OCCUPATIONS.	WHOLE STATE.			PROVIDENCE CITY.			REST OF STATE.		
	Number who Died.	Aggregate Age.	Average Age.	Number who Died.	Aggregate Age.	Average Age.	Number who Died.	Aggregate Age.	Average Age.
I. AGRICULTURE.	155	10,124	65.32	7	499	71.28	148	9,625	65.03
II. PROFESSIONAL AND PERSONAL SERVICES.	287	14,175	49.39	134	6,516	48.63	153	7,659	50.06
III. TRADE AND TRANSPORTATION.	145	8,016	55.28	81	4,281	52.85	64	3,735	58.36
IV. MANUFACTURES, MECHANICAL AND MINING INDUSTRIES.	371	18,868	50.86	171	8,547	49.98	200	10,321	51.61
V. FEMALES.	49	1,677	34.22	24	822	34.25	25	855	34.20
ALL CLASSES. ...	1,007	52,860	52.49	417	20,665	49.56	590	32,195	54.57

TABLE X.—OCCUPATIONS AND CAUSES OF DEATH, 1878.

Deaths at ages under 20 years being excluded.

OCCUPATIONS.	CAUSES.																									
	Whole Number of given Causes.	Abcess.	Accidents.	Aneurism.	Apoplexy and Paralysis.	Bladder, Disease of.	Brain, Disease of.	Bronchitis.	Cancer.	Cholera Morbus.	Colic.	Consumption.	Debility.	Diabetes.	Diphtheria.	Dropsy.	Dysentery.	Epilepsy.	Krysipelas.	Revers.	Gangrene.	Heart, Disease of.	Hemorrhage.	Hernia.	Insanity.	Intemperance and Delirium Tremens.
Farmers *	146	1	3	16	4	9	1	16	1	1	1	16	1	1	1	6	1	1	1	1	7	2	11	1	1	1
Gardeners	8																									
I. AGRICULTURE.																										
II. PROFESSIONAL AND PERSONAL SERVICES.																										
Artists	1																									
Authors	1																									
Barbers	4																									
Canvasser	1																									
Civil Engineers	2																									
Clergymen	2																									
Clerks and Salesmen *	24																									
Coachmen	2																									
Collector	1																									
Constables	2																									
Cook	1																									
Hostlers	1																									
Hotel-keepers	3																									
Janitors	2																									
Labourers *	191																									
Laundryman (Chinese)	14																									
Lawyers	1																									
Musicians	4																									
Music-teachers	2																									
Photographer	4																									
Police-men	2																									
Reporters	2																									
CAUSES.																										
Abcess	1																									
Accidents	1																									
Aneurism	1																									
Apoplexy and Paralysis	1																									
Bladder, Disease of	1																									
Brain, Disease of	1																									
Bronchitis	1																									
Cancer	1																									
Cholera Morbus	1																									
Colic	1																									
Consumption	1																									
Debility	1																									
Diabetes	1																									
Diphtheria	1																									
Dropsy	1																									
Dysentery	1																									
Epilepsy	1																									
Krysipelas	1																									
Revers	1																									
Gangrene	1																									
Heart, Disease of	1																									
Hemorrhage	1																									
Hernia	1																									
Insanity	1																									
Intemperance and Delirium Tremens	1																									
Kidneys, Disease of	8																									
Liver, Disease of	5																									
Lungs, Disease of	5																									
Meningitis, Cerebro-Spinal	30																									
Murder and Homicide	30																									
Old Age	18																									
Pertinitis	18																									
Pneumonia	18																									
Prostate, Disease of	18																									
Rheumatism	18																									
Stomach, Disease of	18																									
Suicide	18																									
Syphilis	18																									
Tetanus	18																									
Tuberculosis	18																									
Tumor	18																									

OCCUPATIONS.

OCCUPATIONS.	Whole Number of given Causes.
Saloons-keepers.	6
Stable-keepers.	1
Student.	1
Teachers *	2
Undertaker	1
Waiters	2
Watchman.	2
III. TRADE AND TRANSPORTATION.	
Agents-	8
Apothecaries	2
Bankers	2
Book-keepers	12
Butcher	2
Business	2
Cashiers	7
Cashiers (Bank, &c.)	2
Expressmen	2
Fishermen and Oystermen	2
Grocers	8
Hackman	1
Insurance	6
Liquor Dealers	9
Mariners	2
Markettan	4
Mechants *	1
Peddlers	1
Porter	6
Railroad Station Agent	1
Ship Chandlars	1
Teamsters *	13
Telegrapher	2
Traders and Dealers *	9

TABLE X.—OCCUPATIONS AND CAUSES OF DEATH, 1878.—Concluded.

RECAPITULATION BY CLASSES.

OCCUPATIONS.	Whole Number of Given Causes.																								
I. AGRICULTURE.....	149	1	3	16	4	0	1	1	17	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
II. PROFESSIONAL AND PERSONAL SERVICES.	272	16	22	9	2	6	1	85	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
III. TRADE AND TRANSPORTATION.....	141	2	5	15	1	8	8	..	25	8	..	5	1	1	3	2	1	4	13	1	..	1	12	6	1
IV. MANUFACTURES, MECHANICAL AND MIN- ING INDUSTRIES.....	359	2	20	2	36	1	12	3	2	8	100	..	5	6	1	2	1	2	15	1	3	2	8	4	1
V. FEMALES.....	42	1	1	2	..	..	2	..	17	..	..	..	1	..	1	2	1	..	8	2	1	..	1	1	1
ALL CLASSES.....	993	6	45	4	91	2	33	8	33	5	244	4	1	10	4	17	7	3	5	42	7	2	5	8	43

* In addition to those given under the above diseases, there were as follows:

In Class I., one Farmer died from Heat; one of Asthma, and one of Hydrophobia.

In Class II., one Laborer died of Gallstones; one of Laryngitis; one of Exposure to Cold; one from Heat, and one by Lightning; one Salesman of Spleen Disease; one Teacher of Septicæmia.

In Class III., one Merchant died of Skin Disease; one Teamster by Lightning; one Trader of Asthma.

In Class IV, one Shoemaker died of Neglect; one Jeweler of Septicæmia; one Brush-maker of Tabes Mesenterica; one Machinist of Marasmus; one Manufacturer of Convulsions; one Operative of Intussusception; one tallow of Jaundice, and one of Uremia.

TABLE XI.
BIRTHS, MARRIAGES AND DEATHS IN RHODE ISLAND,
IN 1878, COMPARED WITH THE POPULATION
BY THE CENSUS OF 1875.

TOWNS AND DIVISIONS OF THE STATE.	Population in 1875.	Births in 1878.	To population one birth in	Marriages in 1878.	To population one person married in	Deaths in 1878.	Of population one death in	Deaths in each 100 of the population.
Barrington.....	1,185	20	59.25	5	118.50	23	51.52	1.94
Bristol.....	5,829	159	36.66	51	57.15	85	68.56	1.45
Warren.....	4,005	79	50.69	48	41.72	85	47.12	2.12
BRISTOL COUNTY.....	11,019	258	42.75	104	52.97	193	57.09	1.73
Coventry.....	4,580	91	50.38	36	63.61	80	57.25	1.73
East Greenwich.....	3,120	59	60.00	30	52.00	40	78.00	1.28
West Greenwich.....	1,084	23	44.96	7	73.86	16	64.62	1.55
Warwick.....	11,614	294	40.89	73	79.55	152	76.41	1.31
KENT COUNTY.....	20,348	450	45.22	146	69.69	288	70.65	1.41
Jamestown.....	488	9	54.28	2	122.00	4	122.00	.82
Little Compton.....	1,156	9	128.44	10	57.80	12	96.33	1.04
Middletown.....	1,074	32	33.56	6	89.50	13	82.61	1.22
New Shoreham.....	1,147	12	95.58	1	573.50	9	127.44	.78
Portsmouth.....	1,893	28	67.61	5	189.30	20	94.45	1.06
Tiverton.....	2,101	67	31.36	17	61.78	18	116.76	.85
TOWNS, NEWPORT COUNTY.....	7,839	157	50.06	41	95.84	76	105.41	.96
NEWPORT CITY.....	14,028	476	29.66	127	55.22	223	62.91	1.51
Burrillville.....	5,249	130	40.37	34	77.19	66	79.56	1.26
Cranston.....	5,688	148	38.43	18	157.60	88	64.64	1.55
Cumberland.....	5,673	165	34.39	54	52.53	87	65.21	1.33
East Providence.....	4,336	166	26.12	19	114.10	90	48.18	2.04
Foster.....	1,543	22	70.14	42	18.37	16	96.44	1.04
Glocester.....	2,098	48	43.71	30	34.97	38	55.21	1.92
Johnston.....	4,999	135	37.08	27	92.57	46	108.68	.92
Lincoln.....	11,565	335	34.22	54	107.04	208	55.60	1.80
North Providence.....	1,308	26	50.12	2	325.70	14	98.07	1.07
North Smithfield.....	2,797	62	45.11	28	49.95	38	73.61	1.33
Pawtucket.....	18,464	528	34.97	168	54.95	332	55.61	1.79
Scituate.....	4,101	80	51.26	40	51.26	71	57.76	1.73
Smithfield.....	2,857	74	38.61	20	71.42	30	95.23	1.05
Woonsocket.....	13,576	404	33.60	147	46.18	257	47.30	2.11
TOWNS, PROVIDENCE COUNTY.....	84,249	2,323	36.22	683	61.67	1,411	59.71	1.68
PROVIDENCE CITY.....	100,673	2,585	38.95	1,016	49.50	1,969	80.62	1.96
Charlestown.....	1,054	14	75.29	7	75.29	15	70.27	1.42
Exeter.....	1,355	23	58.91	16	42.35	17	79.71	1.35
Hopkinton.....	2,760	65	42.62	41	33.61	47	58.73	1.70
North Kingstown.....	3,505	94	37.29	29	60.41	57	61.49	1.63
South Kingstown.....	4,240	106	40.00	39	54.36	47	90.21	1.11
Richmond.....	1,739	49	35.49	15	57.86	30	57.96	1.73
Westerly.....	5,408	114	47.44	60	45.07	48	112.54	.88
WASHINGTON COUNTY.....	20,061	465	43.14	207	48.45	261	76.96	1.30
WHOLE STATE.....	258,239	6,714	38.46	*2,324	55.67	4,441	58.10	1.72

* Correction of Table I. by a corrected town return, received after the Table was in print.

COMMENTS.

An examination of Table XI will show that the largest proportional number of births is returned from the town of East Providence, which reports one birth to every 26.12 persons in the town; the city of Newport follows, with one birth to every 29.68; and Tiverton with one to every 31.36.

On the other hand, the smallest proportional number of births to inhabitants is returned from the town of Little Compton, where but one birth is recorded to every 128.44 persons.

It will be observed that Bristol, Kent and Washington counties vary but slightly in their proportional birth rates, while Providence and Newport counties show a considerable difference in comparison with the three counties first named. For the whole State, the birth rate is one to every 38.46.

The difference in the ratio of marriages to population is more remarkable than that of births. New Shoreham reports one person married in every 573.50 of the population; North Providence, one person married to every 325.70. While, at the other extreme, Foster reports the extraordinary ratio of one person married to every 18.37 of the permanent residents, or one to less than every five families. The ratio for the whole State is one to every 55.67 of the population.

The largest percentage of deaths during the year 1878, was in the town of Warren, which was one decedent to every 47.12 persons, or 2.12 in each 100 of the population. Next following, one in 47.30 in Woonsocket; next, one in 48.18 in East Providence, and one in 50.63 in Providence city, or 1.98 per cent. of the population. Three towns only report a death rate of more than two per cent., viz.: Warren, 2.12; Woonsocket, 2.11; East Providence, 2.08.

The minimum of mortality in any one of all the towns in the State, for the year 1878, is reported from New Shoreham, and is one death in every 127.44 persons, or but little more than three-quarters of one per cent. of the population.

The towns reporting a death rate of less than one per cent. for the year, are New Shoreham, 0.78; Jamestown, 0.82; Tiverton, 0.85; Westerly, 0.38, and Johnston, 0.92.

The death rate for the whole State, is one decedent to every 58.06 of the population, or 1.72 in each 100.

The whole number of births recorded in 1878, is 6,714; marriages, 2,324, and deaths, 4,441.

In order to ascertain more definitely and correctly the average relation of these events to the population of the several towns in the State, for a series of years, the following Table is subjoined.

TABLE XII.

Showing the Number of Births, Marriages and Deaths, in each town in the State, during each of the four years, 1875, 1876, 1877 and 1878, inclusive, with the aggregates of the same; also the proportions of the average number of the same to the population in each town, during the same period.

TOWNS AND DIVISIONS OF THE STATE.	Population in 1875.	BIRTHS.				MARRIAGES.				DEATHS.				PERCENTAGE.
		1875.	1876.	1877.	1878.	1875.	1876.	1877.	1878.	1875.	1876.	1877.	1878.	
		Whole num- ber Births, four years.	Average to population one in every	Whole number Mar- riages, four years.	Average to population one in every	Whole number Mar- riages, four years.	Average to population one in every	Whole num- ber Deaths, four years.	Average to population one in every	Whole num- ber Deaths, four years.	Average to population one in every	Whole num- ber Deaths, four years.	Average to population one in every	
Barrington.....	1,185	16	24	12	20	4	11	5	5	20	17	20	28	59.24
Bristol.....	2,329	197	182	145	159	54	42	39	51	79	71	101	85	82.88
Warren.....	4,005	74	70	65	79	42	34	40	48	66	74	80	85	52.52
Bristol County.....	11,019	287	276	222	256	100	87	84	104	165	162	201	193	61.13
Coventry.....	4,580	77	86	43	91	36	29	31	36	82	61	52	80	27.5
East Greenwich.....	8,120	69	53	57	52	28	22	22	30	61	46	52	40	19.9
West Greenwich.....	1,034	31	22	17	23	7	9	3	8	22	13	11	16	62
Warwick.....	11,614	211	250	217	284	88	126	91	73	139	119	151	152	82.06
Kent County.....	20,246	388	411	324	450	160	192	147	146	304	289	266	288	74.62
Jamestown.....	488	3	3	5	9	1	1	3	2	5	8	3	4	20
Little Compton.....	1,156	24	19	24	9	16	8	7	10	18	12	14	12	56
Middletown.....	1,074	14	22	14	22	5	5	4	6	20	10	14	13	45
New Shoreham.....	1,147	84	10	20	12	10	10	9	1	30	78.45	16	7	42
Portsmouth.....	1,898	24	19	28	28	12	12	20	5	49	18	20	11	20
Tiverton.....	2,101	60	46	42	67	33	11	32	17	84	36	30	18	118
Towns, Newport Co.	7,859	149	119	133	157	77	42	75	41	235	99	93	82	76
Newport City.....	14,088	363	396	261	476	180	102	107	137	197	208	189	223	812
Newport County.....	21,867	511	415	514	633	200	144	162	162	396	371	396	399	1,162
														74.80
														1.34

COMMENTS.

In Table XII will be found the number of births, marriages and deaths, in each of the towns, in each of the last four years of registration, together with the aggregate of the same in each of the towns, and in each of the counties during that period, and also a comparison of the average of these several events to the population, on the basis of the Census of 1875.

On consulting the Table, it will be seen that the proportions of the average number, for the whole period of four years, of the three classes of events, in the several towns, vary very greatly, as previously stated, in comparison with the population, but when aggregated into counties, the difference is considerably lessened, though even then they are far from uniform. While the average number of births in Woonsocket, for the period named, is one to every 32.63 of the population, the average of Jamestown is one to every 97.60.

The towns of Providence county show an average birth, for the period of four years, of one to every 37.16; the towns of Newport county, an average of one birth to every 56.08; Providence city, one in every 38.70, and Newport city, one in every 37.01.

The difference between the towns of Newport county and Newport city is quite remarkable. The average for the whole county of Newport is one in every 42.24, and for Providence county, one in 38.03.

The proportions of the average, for the same period, of the other counties are: Bristol, one in every 42.24; Kent, one in 51.40; Washington, one in 48.98. Average for the whole State, one birth in every 40.06 of the population.

The highest average marriage rate for the four years, is found in the town of Foster; that is, one person married to every 28.58 of the population. The town having the lowest average rate is Cranston, one person married to every 177.74 of the inhabitants.

The counties also vary considerably in the marriage rate. Washington county leading, with the marriage of one person to every 48.98 of the population, which is also the birth rate, or two children born to every marriage recorded. Providence county follows, with a rate of one to every 54.35; Newport county, one to 63.10; Kent county, one to 65.08, and Bristol county the smallest average, viz.: one to every 80.14 of the population. For the whole State, the mean average of the four years is one person married in every 55.32.

The highest average death rate is found in the town of Woonsocket; that is, one decedent in every 45.96 of the population, or 2.18 in each 100; next, Cranston, one in every 48.10, or 2.09 per cent.; Lincoln, one in 49.30, or 2.03 per cent. These are the only towns having a death rate reaching as high as two per cent.

Providence city shows an average rate, for the four years, of one decedent in every 52.25, or 1.91 per cent., and the town of Warren, one in every 52.50, or 1.90 per cent.

The lowest average death rate is found in Portsmouth; that is, one decedent in every 109.72 of the population, or 0.90 per cent.; next, New Shoreham, one in 109.23, or 0.91 per cent.; Smithfield, one in 99.37, or about 1.00 per cent. These are all the towns having a death rate as low as one per cent. or less.

The average death rate for the counties varies from one in every 56.05, or 1.78 per cent., in Providence county, to one in every 74.80, or 1.34 per cent., in Newport county. Newport county, towns, show only one decedent in every 89.81, or 1.10 per cent., while Newport city shows one in every 69.12, or 1.43 per cent. Providence county, towns, show one death in every 62.08, or 1.61 in each one hundred, while Providence city shows one in every 52.25, or 1.91 per cent.

The other counties show the average rate of one decedent in every 61.13, or 1.63 per cent., in Bristol county; one in every 69.96, or 1.43 per cent., in Washington county, and one in every 74.62, or 1.30 per cent., in Kent county.

For the whole State, the average of the four years is one decedent in every 59.87, or 1.67 in each 100 of the population.

For a more rapid comparison of the average percentage to the population of the births, marriages and deaths, in the different counties, for the period of four years, from 1875 to 1878, inclusive, the following synopsis is added:

	Marriages		
	Births	one person married	Deaths
	one in every	in every	one in every
Bristol County.....	42.24.....	80.14.....	61.13.....
Kent County	51.40.....	65.08.....	74.62.....
Newport County.....	42.24.....	68.10.....	74.80.....
Providence County.....	38.08.....	54.35.....	56.05.....
Washington County	48.98.....	48.98.....	69.96.....
Whole State.....	40.06.....	55.32.....	59.87.....

It may be of interest to contrast the births, on the basis of each 100 of the same, for the last four years, with the number of persons married, and with the deaths for the same period, in each of the larger divisions of the State.

In Bristol county the aggregate of births for the period named, were 1,043; number of persons married, 550; number of deaths, 721. The proportions, therefore, stand as follows: For every 100 births there were 69.13 deaths, and 26.36 marriages, or 52.72 persons married.

In Kent county, the aggregates were: births, 1,583; marriages, 645; deaths, 1,097. The proportions are as follows: For every 100 births there were 40.74 marriages, or 81.48 persons married, and 69.36 persons died.

In Newport county there were 2,073 births, 700 marriages and 1,162 deaths. The ratio for every 100 births, 33.50 marriages, or 67.00 persons married, and 56.05 persons died.

In Providence county there were 19,469 births, 6,805 marriages and 13,197 deaths. For every 100 births there were 35.00 marriages, or 70.00 persons married, and 67.78 deaths.

In Washington county there were 1,637 births, 819 marriages, and 1,147 deaths. For every 100 births there were 50 marriages, or 100 persons married, and 70 persons died.

In the whole State for the same period, there were 25,786 births; 9,344 marriages, or 18,688 persons married, and 17,324 persons died. The proportions for the whole State are, therefore, for every 100 births there were 36.21 marriages, or 72.42 persons married, and 67.02 persons died.

The following recapitulatory summary, will present the foregoing remarks more concisely and clearly:

	Persons Married.	Deaths
Bristol County.....To every 100 births there were.....	52.72.....	and 69.13
Kent County.....To every 100 births there were.....	81.48.....	and 69.36
Newport County.....To every 100 births there were.....	67.00.....	and 56.05
Providence County.....To every 100 births there were.....	70.00.....	and 67.78
Washington County.....To every 100 births there were.....	100.00.....	and 70.00
Whole State.....To every 100 births there were.....	72.42.....	and 67.02

TABLE XIII.

Showing the proportions of Births, Marriages and Deaths, to the population, in the aggregate for the whole State, in each of the last ten years.

YEARS.	BIRTHS.		MARRIAGES.		DEATHS.		
	Number.	To population one birth in	Number.	Of population one person married in	Number.	Of population one death in	Deaths in each 100 of the population.
1869.....	5,245	41.4	2,289	47.5	3,382	64.2	1.56
1870.....	5,215	41.7	2,362	46.0	3,298	67.1	1.49
1871.....	5,678	38.2	2,336	46.5	3,844	65.0	1.54
1872.....	6,143	35.4	2,537	42.9	4,247	51.2	1.95
1873.....	6,022	36.1	2,690	41.3	4,408	49.4	2.06
1874.....	6,466	39.9	2,541	50.8	4,229	61.1	1.64
1875.....	6,508	39.7	2,485	52.0	4,817	59.8	1.67
1876.....	6,329	40.8	2,253	57.3	4,116	62.7	1.59
1877.....	6,225	41.4	2,282	56.6	4,450	58.0	1.72
1878.....	6,714	38.5	2,324	55.7	4,441	58.1	1.72

B I R T H S , 1 8 7 8 .

In Tables I and II, on pages 18 to 21, inclusive, will be found the general statistics in relation to births in Rhode Island during the year 1878. The whole number reported, is 6,714, which is larger by 479 than during the year 1877, and larger by more than 200, of any previous year in the history of the State.

SEX OF THE CHILDREN BORN.

Of the 6,714 children whose births were reported in 1878, there were 3,402 males, and 3,312 females. This gives 102.7 males to each 100 females; or 50.67 males and 49.33 females in each 100 children. The following recapitulatory Table shows the numbers and sex, and the proportions of each sex of the children born in Rhode Island, in each of the last twenty-five years.

TABLE XIV.

Years.	Males.	Females.	Males to each 100 Females.	Males.	Females.
1854.....	1,081.....	1,008.....	107.8, or.....	51.87 and 48.13 in each 100.	
1855.....	1,422.....	1,421.....	105.0, or.....	51.22 and 48.78 in each 100.	
1856.....	1,479.....	1,407.....	105.1, or.....	51.26 and 48.73 in each 100.	
1857.....	2,057.....	1,948.....	105.6, or.....	51.36 and 48.64 in each 100.	
1858.....	2,200.....	2,068.....	107.2, or.....	51.73 and 48.27 in each 100.	
1859.....	2,209.....	2,097.....	105.3, or.....	51.30 and 48.70 in each 100.	
1860.....	2,268.....	2,212.....	102.3, or.....	50.57 and 49.43 in each 100.	
1861.....	2,531.....	2,291.....	110.5, or.....	52.49 and 47.51 in each 100.	
1862.....	2,152.....	1,967.....	109.4, or.....	52.25 and 47.75 in each 100.	
1863.....	1,822.....	1,288.....	105.8, or.....	51.41 and 48.59 in each 100.	
1864.....	1,949.....	1,942.....	100.3, or.....	50.09 and 49.91 in each 100.	
1865.....	2,096.....	1,857.....	112.9, or.....	53.02 and 46.98 in each 100.	
1866.....	2,546.....	2,356.....	108.0, or.....	51.94 and 48.06 in each 100.	
1867.....	2,685.....	2,464.....	107.0, or.....	51.87 and 48.13 in each 100.	
1868.....	2,745.....	2,627.....	104.5, or.....	51.10 and 48.90 in each 100.	
1869.....	2,685.....	2,500.....	104.9, or.....	51.19 and 48.81 in each 100.	
1870.....	2,679.....	2,536.....	105.6, or.....	51.37 and 48.63 in each 100.	
1871.....	2,878.....	2,800.....	102.8, or.....	50.69 and 49.31 in each 100.	
1872.....	3,085.....	3,068.....	100.3, or.....	50.22 and 49.78 in each 100.	
1873.....	3,135.....	2,897.....	108.6, or.....	52.06 and 47.94 in each 100.	
1874.....	3,311.....	3,155.....	104.9, or.....	51.21 and 48.79 in each 100.	
1875.....	3,362.....	3,146.....	106.9, or.....	51.66 and 48.34 in each 100.	
1876.....	3,291.....	3,038.....	108.3, or.....	52.00 and 48.00 in each 100.	
1877.....	3,163.....	3,072.....	103.0, or.....	50.73 and 49.27 in each 100.	
1878.....	3,402.....	3,312.....	102.7, or.....	50.67 and 49.33 in each 100.	
25 Years.....	62,948.....	58,497.....	106.5, or.....	51.60 and 48.40 in each 100.	

PROPORTION OF THE SEXES.

The proportion of males, 102.7 to 100 females, in the births of 1878, was 3.8 in each 100 less than the average for the 25 years, inclusive. In only three of the preceding 24 years was the proportion of male children born less than in 1878.

The proportion of the sexes, in any single year, varies greatly in different portions of the State. The number and proportion in each division, in 1878, were as follows:

TABLE XV.

BIRTHS, 1878.	Bristol County.	Kent County.	Newport County, Towns.	Providence County, Towns.	Washington County.	Newport City.	Total.	Providence City.	Whole State.
Males.....	141	246	85	1,167	205	223	2,067	1,335	3,402
Females.....	117	204	73	1,156	200	253	2,062	1,250	3,312
Total.....	258	450	157	2,323	405	476	4,129	2,585	6,714
Males to each 100 Females..	120.5	120.6	118.0	101.0	78.8	88.1	100.2	106.8	102.7

PROPORTION OF THE SEXES: PROVIDENCE CITY AND THE STATE.

The question of the probability "that the different conditions of existence in town and country might influence the proportions of the sexes of the children born," will be considered by comparison of the statistics of births in the city of Providence, which supplies the most essential conditions of city life, with those of the rest of the State.

The number of children born in the city of Providence, during the year 1878, was 2,585, of whom 1,335 were males, and 1,250 were females. The proportion is, therefore, 106.8 males to each 100 females, or 51.64 males and 48.36 females in each 100 children.

In the rest of the State, during the same year, the number of births were 4,129, of which 2,067 were males, and 2,062 were females, or 100.2 males to 100 females; or 50.06 males, and 49.94 females, in each 100 children born.

The following shows the proportion of the sexes of the children born, in Providence, and in the rest of the State, during the years 1877 and 1878, and also in the twenty-five years from 1854 to 1878, inclusive:

1877.

	Males to each				
	Males.	Females.	100 Females.	Males.	Females.
Providence City.....	1,302	1,241	104.9, or.....	51.20	and 48.80 in each 100.
Rest of the State.....	1,861	1,831	101.6, or.....	50.41	and 49.59 in each 100.

1878.

	Males to each				
	Males.	Females.	100 Females.	Males.	Females.
Providence City.....	1,335	1,250	106.8, or.....	51.64	and 48.36 in each 100.
Rest of the State.....	2,067	2,062	100.2, or.....	50.06	and 49.94 in each 100.

TWENTY-FIVE YEARS, 1854 TO 1878, INCLUSIVE.

	Males to each				
	Males.	Females.	100 Females.	Males.	Females.
Providence City... ..	24,051	22,774	105.6, or....	51.36	and 48.64 in each 100.
Rest of the State.....	38,397	35,723	107.2, or.....	51.74	and 48.26 in each 100.

The foregoing comparisons show that although the proportional number of male births in the city of Providence, for the years 1877 and 1878, were considerably in excess of the same in the rest of the State, for the same years, it does not hold good for the long period of twenty-five years.

The following Table shows the relative proportions of the sexes, in each division of the State, in each of the last sixteen years. This Table does not show the contrast between Providence city and the rest of the State; the statistics are for the "Whole State," and include those of the city.

TABLE XVI.

NUMBER OF MALES TO EACH 100 FEMALES.

BIRTHS.	Bristol County.	Kent County.	Newport County.	Providence County, Towns.	Providence City.	Washington County.	Whole State.
1863.....	120.0	98.4	97.0	101.8	111.4	108.7	105.8
1864.....	106.8	87.3	90.6	107.4	97.3	103.4	100.3
1865.....	119.3	118.2	108.8	118.9	113.8	88.1	112.9
1866.....	109.4	113.1	108.4	104.9	108.4	124.0	108.0
1867.....	115.5	98.3	117.8	106.3	104.5	120.4	107.7
1868.....	117.4	88.7	100.2	101.6	102.4	126.5	104.5
1869.....	115.7	116.7	102.7	98.0	107.5	120.6	104.9
1870.....	126.4	111.6	100.0	105.1	104.9	99.5	105.6
1871.....	131.8	97.9	122.5	100.8	95.2	113.3	102.8
1872.....	109.2	92.8	109.1	108.5	95.7	110.6	100.9
1873.....	129.2	113.0	117.9	104.5	109.0	104.7	108.6
1874.....	98.7	111.9	101.3	110.4	102.9	94.0	104.9
1875.....	95.2	103.1	97.7	104.3	109.1	134.3	106.9
1876.....	142.1	104.4	106.5	106.0	106.6	108.7	108.3
1877.....	128.7	102.4	96.5	100.3	104.9	95.3	103.0
1878.....	120.5	120.6	94.8	101.5	106.8	78.8	102.7

BIRTHS: SEX AND SEASON.

In Table II, on page 20, will be found the number of births, as they occurred during the year 1878, arranged by the several months, and by the sexes. From it we ascertain the number of each of the sexes born during each quarter of the year, with their relative proportions, and also the aggregate and proportions of the same for the whole State.

The following Table will present a summary of the quarterly periods, number of births and proportion of the sexes, for the same:

	Males to each			Males to each	
	Males.	Females.		Males.	Females.
1. January—March.....	837.....	785.....	106.6, or.....	51.50 and 48.50 in each 100.	
2. April—June.....	778.....	787.....	98.9, or.....	49.35 and 50.35 in each 100.	
3. July—September.....	880.....	851.....	103.3, or.....	50.83 and 49.17 in each 100.	
4. October—December.....	907.....	889.....	102.0, or.....	50.50 and 49.50 in each 100.	
Year, 1878.....	3,402.....	3,312.....	102.7, or.....	50.06 and 49.94 in each 100.	

The following Table shows the number of male children born to each 100 female children, in each quarter of each of the last thirteen years:

TABLE XVII.

YEARS.	1878.	1877.	1876.	1875.	1874.	1873.	1872.	1871.	1870.	1869.	1868.	1867.	1866.
First Quarter.....	106.6	107.9	105.7	97.7	100.4	98.8	98.8	112.4	111.6	107.8	102.4	105.5	108.7
Second Quarter.....	98.9	108.1	109.2	118.8	108.2	105.9	100.5	95.0	100.8	105.1	118.8	108.9	102.9
Third Quarter.....	108.8	97.6	108.0	108.2	105.1	109.9	101.6	99.3	101.0	101.9	108.1	110.4	113.8
Fourth Quarter.....	102.0	104.2	110.4	107.9	105.9	110.4	108.4	105.0	109.2	105.6	96.2	106.5	106.6
Whole Year..	102.7	108.0	108.3	106.9	104.9	108.6	100.9	102.8	105.6	104.9	104.5	107.7	108.0

The proportion of male to female children born during the year 1878, in the whole State, was more nearly equal, than during any one of the last thirteen years, except the year 1872. As usual, there are considerable differences between the several quarters of the year, though not so great as in the larger number of years.

For the purpose of illustrating more fully the possible influence of season upon the development or causation of sex of the children born in Rhode Island, the following Table has been continued from the Registration Report of 1877, which shows the number and sex of the children born in the State, in each quarter of the year, in the aggregate for seventeen years, from 1860 to 1876, inclusive; and also the proportion of the sexes in each quarter:

Seventeen Years.	Males to each			
	Males.	Females.	100 Females.	Males. Females.
1. January—March.....	10,600	10,028, or.....	105.7, or.....	51.39 and 48.61 in each 100 born.
2. April—June.....	10,720	10,085, or.....	106.8, or.....	51.65 and 48.35 in each 100 born.
3. July—September.....	11,648	11,068, or.....	105.0, or.....	51.22 and 48.78 in each 100 born.
4. October—December.....	12,285	11,530, or.....	106.5, or.....	51.58 and 48.42 in each 100 born

Whole No. of Years...45,253.....42,686, or... 106.0, or..... 51.46 and 48.54 in each 100 born.

In the report for the year 1879, the number may be extended to a period of twenty years, which may, perhaps further elucidate the question, though it is not at all probable that it will materially alter the results shown in the above tabulation.

BIRTHS AND SEASON.

As a question not merely of speculative curiosity, but of considerable importance, the influence of season upon human fruitfulness may properly receive some attention.

The following Table shows the total number of children, without regard to sex, born in the State of Rhode Island, (according to the returns,) in each quarter of each of the last nine years; and also the aggregate number and the percentage of the aggregate in each quarter for twenty-five years, from 1853 to 1877, inclusive :

TABLE XVIII.

QUARTERS.	1878.	1877.	1876.	1875.	1874.	1873.	1872.	1871.	1870.	1853 to 1877.	
										Number.	Per cent.
January—March.....	1,632	1,399	1,524	1,546	1,465	1,363	1,348	1,532	1,188	27,417	23.73
April—June.....	1,565	1,406	1,496	1,606	1,555	1,399	1,464	1,390	1,243	27,610	23.80
July—September....	1,731	1,674	1,668	1,668	1,632	1,563	1,663	1,475	1,327	30,315	26.15
October—December...	1,796	1,756	1,641	1,686	1,744	1,656	1,668	1,573	1,462	30,332	26.24
Whole Year.....	6,714	6,235	6,329	6,506	6,466	6,022	6,143	5,678	5,215	115,564	100.00

It will be noticed upon inspection of the above Table, that the reported occurrence of births during the year 1878 has followed the general rule for the period of nine years, in the occurrence of the smaller number of these events during the first half of the year. It may be said also to be the rule for the whole period of registration. It will also be observed, that during the last nine years the numbers have almost uniformly increased regularly from the first quarter to the last. The reason is, without question, due more to defective registration than to any influence of the season.

It has been found that in those cities and sections where the returns of births are collected semi-annually, that no such disparity of numbers of births, occurring in the earlier and later months of the year, exists, although the number still holds somewhat larger for the later months.

The collector of returns, canvassing a town in the month of January of a year succeeding that in which the births occurred, will fail to find some families in which there have been births during the first months of the previous year, for the reason that they have removed

to other towns. Then, again, some parents even, from forgetfulness or heedlessness, and especially when a child dies during the first weeks or months of infancy, will fail to report to the collector when called upon. But for the later months of the year, in Rhode Island, the removal of families is very much less frequent, and the memory of heedless persons called upon in the January following has not so long a period of time to cover.

It is, however, quite possible that the circumstances of season, the modes of living, the temperature and other meteorological conditions of the colder months, may have some influence in the aptness to reproduction.

The percentages of the different quarters of the year 1878, were as follows: First quarter, 24.15; Second quarter, 23.30; Third quarter, 25.78; Fourth quarter, 26.75.

It will be seen that the percentages of the several quarters correspond very closely with the average percentages of the same quarters, for the period of twenty-five years, scarcely exceeding one-half of one per cent. in any instance.

PARENTAGE.

The following Table will show the parentage of the children born in the State, and the variations of the same from year to year, in each of the last six years, and also the number and variations occurring in three periods of five years each, from 1858 to 1872, inclusive:

TABLE XIX.

PARENTAGE.	1878.	1877.	1876.	1875.	1874.	1873.	5 years. 1868 to 1872.	5 years. 1863 to 1867.	5 years. 1858 to 1862.
American.....	2,887	2,665	2,585	2,727	2,708	2,751	12,314	9,712	10,609
Foreign.....	2,848	2,642	2,873	2,906	2,948	2,621	12,966	9,968	9,697
Amer. father and For. mother...	463	416	354	389	345	278	1,353	876	814
For. father and Amer. mother...	516	512	517	486	470	372	1,720	941	755
Parentage not stated.....								70	223
Total.....	6,714	6,225	6,329	6,506	6,466	6,022	27,653	21,567	22,098

In order to present the comparisons in a different and, perhaps, clearer light, the following Table of percentages is subjoined:

TABLE XX.

PARENTAGE.	1878.	1877.	1876.	1875.	1874.	1873.	5 years. 1868 to 1872.	5 years. 1868 to 1867.	5 years. 1868 to 1863.
American.....	43.00	42.74	40.84	41.90	41.80	45.68	44.17	45.18	48.50
Foreign.....	42.82	42.38	45.40	44.65	45.59	43.52	44.72	46.37	44.33
Amer. father and For. mother...	6.35	6.67	5.59	5.98	5.34	4.62	4.89	4.07	3.72
For. father and Amer. mother...	7.83	8.21	8.17	7.47	7.27	6.18	6.22	4.38	3.45
Total.....	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

A study of the preceding Tables will show, as might reasonably be expected, that the number of births occurring among the different classes of the population, varies very considerably in the different years.

The percentage of children of purely American parentage, in proportion to the whole number of births, had gradually declined for a series of years, until in 1876, it was only 40.84; in 1877, it had risen to 42.74; and in 1878, to 43.00 in each 100.

Of the children of purely foreign parentage, the percentage has been in excess of the purely American, for a considerable number of years, with the exceptions of 1873, 1877 and 1878.

Of the class of mixed parentage, the percentage of births has steadily increased up to the year 1878, in which there was a slight decrease. The social sentiment has evidently been increasing in the direction of the breaking down of class distinctions dependent on nativity, and the slight pause during the year 1878, will doubtless be temporary.

Table XIX shows that there were, in 1878, more foreign than American fathers, and more American than foreign mothers. Inasmuch as it is conceded that foreign mothers are more prolific on American soil than native American mothers, the natural inference would be that more American wives have foreign husbands, than *vice versa*, and such will be found to be true, when the subject of marriages is taken up.

Table XX shows a larger percentage of children born, in 1878, of purely American than purely foreign parentage. But this is true only in the proportion to the whole number of births during the year, and not in the proportion of the births to the whole population. There being a larger American than foreign population, we should

expect, all other things being equal, that there would be not only a larger number of births of American parentage, but that the percentage would be in an equal ratio with the population. Such, however, is not the fact.

By the Census of 1875, the population, according to parentage, was as follows:

American.....	134,722, or 52.17 per cent.
Foreign.....	122,517, or 47.83 per cent.

The above enumeration was in accordance with the nativity of the fathers, and for reasons stated above, slightly in favor of the foreign element. If, now, we compare the number of children born in the different classes, in 1878, with the proportion the same classes bear to the whole population, we shall find that of each 100 children born, 49.89 had American fathers, and 50.11 had foreign fathers.

In order to contrast the number and percentages of the children born in the different classes, as seen in the two preceding Tables, with the percentages according to the population, for the same number of years, the following Table is introduced:

TABLE XXI.

CHILDREN WITH	1876.	1877.	1876.	1876.	1874.	1873.	5 years. 1868 to 1873.	5 years. 1868 to 1867.	5 years. 1868 to 1862.
American fathers.....	49.89	49.41	46.43	47.88	47.14	50.30	49.06	49.25	52.22
Foreign fathers.....	50.11	50.59	53.57	52.12	52.86	49.70	50.94	50.75	47.78
American mothers.....	50.68	50.95	49.01	49.37	49.07	51.86	50.39	49.56	51.95
Foreign mothers.....	49.32	49.05	50.99	50.63	50.93	48.14	49.61	50.44	48.05

It will be seen that the percentage of children born of American parentage, has been almost uniformly less than the proportion of the American to the whole population, and the percentage of children born of foreign parentage, has been equally uniform in being larger than the proportion of that class to the whole population.

COLORED CHILDREN.

The number of births of children of colored parentage, reported for the year 1878, is 172. They are always included in the general statis-

tics of births, but having some special importance as to the survival of the race, and other questions, they have had a separate consideration. The number is larger by 4 than that of 1877. Larger by 1 than that of 1876, and larger by 16 than that of 1875.

In regard to sex, the numbers and proportions were as follows, viz.: Males, 79; females, 93; or 46.00 males and 54.00 females in each 100 births; or 85.00 males to each 100 females.

The towns reporting colored births in 1878, and the number in each, are as follows:

Bristol.....	8	East Providence.....	2	Hopkinton.....	4
East Greenwich.....	2	Johnston.....	2	North Kingstown.....	2
Warwick.....	4	Lincoln.....	1	South Kingstown.....	9
Newport City.....	27	Pawtucket.....	2	Westerly.....	2
Cranston.....	2	Charlestown.....	1	Providence City.....	104
Total.....			172.		

NUMBER OF THE CHILD OF THE MOTHER.

The following Table will be found interesting, as showing the capacity of the females of Rhode Island for long periods and frequent repetition of productiveness. The general condition of the public health, and the physical vigor and power of endurance of any class of people, may be determined in a large measure by such statistics. In Rhode Island, however, they would be less reliable than in sections of this or of other countries, where the disposition to avoid a repetition of child-bearing, or of avoiding it entirely, was less universal. The Table shows the number of the child of the mother; that is, how many of the children born were reported as the first, second, third, &c., of their respective mothers. The statistics on this subject begin with the year 1857, and the following Table includes the children reported in 1878, as well as those in the twenty-one years from 1857 to 1877, inclusive, and also the total for twenty-two years, 1857 to 1878, inclusive:

TABLE XXII.

NUMBER OF THE CHILD OF THE MOTHER.	1878.	21 years. 1857 to 1877.	22 years. 1857 to 1878.
First.....	1,462	25,806	27,268
Second... ..	1,360	21,127	22,487
Third.....	1,069	16,356	17,425
Fourth.....	826	12,202	13,028
Fifth.....	569	9,096	9,685
Sixth.....	489	6,510	6,999
Seventh... ..	319	4,568	4,887
Eighth.....	238	3,078	3,316
Ninth.....	136	2,064	2,200
Tenth	96	1,346	1,442
Eleventh... ..	54	752	806
Twelfth.....	38	460	498
Thirteenth.....	18	224	242
Fourteenth.....	8	114	122
Fifteenth.....	7	63	70
Sixteenth.....	2	31	33
Seventeenth.....	1	24	25
Eighteenth... ..	1	6	7
Nineteenth.....	0	5	5
Twentieth.	0	3	3
Twenty-first.....	1	2	3
Twenty-second.....	0	2	2
Total	6,714	108,889	110,653

The proportion of the first children of the mother, born in Rhode Island during the year 1878, according to the returns, was 21.77 in each 100; in 1877, it was 22.93 in each 100, and in the average for twenty-one years, 1857 to 1877, inclusive, it was 24.85 in each 100.

The proportion of second children in 1878, was 20.26 in each 100; in 1877, it was 20.98, and the average for twenty-one years, as above, it was 20.35 in each 100.

In nearly every year there are births, the record of which does not give the number of child of the mother; consequently, the above Table

does not include all the children born and recorded during the periods named.

The following Table shows what percentage of the children born in each of the last eleven years, were the first, second, &c., children of the mothers:

TABLE XXIII.

NUMBER OF THE CHILD.	1878.	1877.	1876.	1875.	1874.	1873.	1872.	1871.	1870.	1869.	1868.
First.....	21.77	22.93	24.11	24.37	25.54	25.27	25.39	25.86	26.41	25.23	27.24
Second.....	20.26	20.96	20.63	20.80	21.09	20.90	20.36	20.78	20.40	20.84	19.83
Third.....	18.90	16.22	16.04	14.93	15.53	15.88	15.64	16.06	15.56	15.02	13.92
Fourth.....	12.32	12.09	12.00	11.78	10.97	11.35	11.52	10.79	10.33	11.30	11.65
Fifth.....	8.77	9.07	8.42	8.81	8.56	8.25	7.96	7.86	8.12	8.39	8.01
First to Fifth.....	82.02	81.29	81.20	80.69	81.69	81.55	80.87	81.35	80.82	80.78	80.65
Sixth and over.....	17.98	18.71	18.80	19.31	18.31	18.45	19.13	18.65	19.18	19.22	19.25
Total.....	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

From the above Table, it will be perceived that the percentages of first and second children of the mother, born in 1878, were the smallest on record during the last eleven years, and the percentages of the third and fourth, were the largest of any one of the same number of years. It will also be noticed, that the aggregate percentages of the classes, from the first to the fifth, inclusive, of the year 1878, is larger than any other recorded during the same period of eleven years.

It will be understood that the decrease in the *percentages* of births of the first and second child of the mother, does not imply a lessened number of such births—which is not true of 1878—but a larger proportional number of third, fourth, &c., number of child. A continuance of the larger percentage of the higher number of child, for two or three years, consecutively, would indicate a healthier public sentiment, as well as improved physical stamina.

PLURALITY BIRTHS.

The statistics of the plurality births in Rhode Island, for 1878, show that there were fifty-six cases during the year; fifty-five of twins and one of triplets. The number of children was 113, of which 74 were males, and 39 were females.

For a period of twenty-six years, viz., from 1853 to 1878, inclusive, the general statistics of births in Rhode Island are as follows:

120,691 cases of single births.....	giving 120,691 children.
1,299 cases of twin births.....	giving 2,598 children.
18 cases of triple births.....	giving 54 children.
<hr/>	
122,008 cases of child-birth.....	giving 123,343 children.

Of the whole number of cases of child-birth (122,008) in the twenty-six years, one in 93.9 produced twins, and one in 6,781 produced triplets.

Of the whole number of children born during the same period, (123,343,) according to the statistics, one in every 47 was a twin, and one in every 2,283 was a triplet.

Of the 1,317 cases of plurality births in the twenty-six years, there were 560 in which both parents were American; 642 cases in which both parents were foreign; 107 cases in which the parentage was mixed, and 8 of which the parentage was unknown.

The whole number of children born in plurality cases during the twenty-six years, was 2,652, of whom 1,328 were males, and 1,320 were females; the sex of the remaining four was not given.

STILL-BORN CHILDREN.

The statistics in relation to still-born children are obtained from the returns of deaths, but are not numbered with, or in any way included in, the statistics of deaths in this report.

For the reason that they occupy a somewhat anomalous position in the statistics of life and death, they are given a separate consideration.

The whole number of still-born children reported in Rhode Island for the year 1878, was 248; this is 6 more than for the year 1877, and 25 more than for 1876.

SUMMARY OF STILL-BORN.

The following Table shows the number and sex of the still-born children, whose births were reported in Rhode Island, during the period from June 1, 1852, to December 31, 1872, and for each of the last six years:

TABLE XXIV.

SEX.	1878.	1877.	1876.	1875.	1874.	1873.	June 1, 1852, to Dec. 31, 1872.	Total.
Males.....	149	147	131	133	172	145	1,966	2,843
Females.....	99	95	92	113	105	83	1,303	1,890
Sex not stated.....							52	52
Total.....	248	242	223	246	277	228	3,321	4,785

It will be seen that the whole number of still-births reported in the State since June 1, 1852, is 4,785. Of the sex of this number, there were 2,843 males; 1,890 females, and of 52 the sex was not given. The ratio of occurrence, in regard to sex, would therefore be as follows: In each 100 children there were 60 males, and 40 females; or for every 100 females, there were 150 males.

It will be seen, also, that the proportion for the year 1878, is almost exactly the same as the average of a period of more than twenty-six years. Why there should be constantly, in every year, so large an excess of males among the still-born, is a question of difficult solution.

Season of Still-births.—The following summary will show the number of still-births that have been reported in Rhode Island, during a period of twenty-six years, from 1853 to 1878, inclusive, with the months and quarters in which they occurred:

STILL-BORN—TWENTY-SIX YEARS—1853-1878. SEASON.

January..... 430	April..... 367	July..... 406	October..... 364
February..... 399	May..... 371	August..... 433	November..... 402
March..... 383	June..... 350	September..... 392	December..... 449
1st Quarter..... 1,312	2d Quarter..... 1,068	3d Quarter..... 1,231	4th Quarter..... 1,215

First six months, 2,300; second six months, 2,446; unknown, 39; total, 4,785.

MARRIAGES, 1878.

The number of marriages reported in Rhode Island in 1878, was 2,324. This number is larger by 142 than in 1877. The number of marriages in each division of the State, in each month and quarter of the year 1878, may be found in Table III, page 22.

SEASON.

The number and percentage of the marriages in Rhode Island, in each quarter of the year 1878, may be found in the following Table, together with the aggregate number and percentage in each quarter, for the twenty-five years previous, viz., from 1853 to 1877, inclusive:

TABLE XXV.

YEARS.		First Quarter.	Second Quarter.	Third Quarter.	Fourth Quarter.	Whole Year.
1878.....	{ Number.....	517	570	558	679	2,324
	{ Percentage.....	22.25	24.52	24.01	29.22	100.00
25 Years. 1853-1877.....	{ Number.....	10,824	11,980	11,484	14,825	48,513
	{ Percentage.....	22.31	24.60	23.60	29.49	100.00

It will be observed that the largest percentage of marriages occurred not only in the last quarter of the year 1878, but also in the percentage of the aggregate of the last quarters for the previous twenty-five years. This rule, which has prevailed so uniformly for so lengthened a term of years, has been variously accounted for. Doubtless the approach of the colder season, and the almost universal disposition to closer companionship during its continuance, aided by the increased social proclivities and warmer manifestations of sentiment and affection during the holiday season, contribute largely to the result.

It will also be observed that the smallest number of marriages, in any one of the quarterly divisions of the year, has been uniformly in the first quarter, during the whole period of registration. Considering the ecclesiastical sentiments of a large proportion of the population in regard to the performance of the ceremony of marriage during the Lenten season, and the largely increased ratio of the previous quarter (one extreme following another), it is not at all remarkable that the percentage is so much smaller for the first quarter.

NATIVITY OF PERSONS MARRIED.

The following Table shows the number of marriages, according to the nativity of the parties, for each of the last eleven years, and also for the aggregate of twenty years, from 1858 to 1877, inclusive:

TABLE XXVI.

BIRTH-PLACE.	1878.	1877.	1876.	1875.	1874.	1873.	1872.	1871.	1870.	1869.	1868.	20 years, 1858-77. Total.
United States.....	1,455	1,407	1,402	1,467	1,495	1,620	1,488	1,408	1,429	1,353	1,464	25,674
Foreign Countries.....	493	496	513	614	695	702	690	625	635	676	517	10,963
Am. groom, for. bride.....	181	177	144	191	154	138	155	157	126	99	135	2,410
For. groom, Am. bride.....	195	202	194	213	197	170	204	151	172	161	169	2,750
Not stated.....												64
Total.....	2,324	2,282	2,253	2,485	2,541	2,690	2,537	2,336	2,362	2,289	2,285	41,861

The number of marriages reported by nativity in 1878, shows an increase in those of purely American birth over the two previous years, 1876-1877, and also an increase in number in the class of American groom and foreign bride for the same time.

The number of marriages among parties of purely foreign birth has almost constantly decreased, from year to year, for the last decade; the three years last past having each a less number than any one of the first three in the ten years, and is smaller for the year 1878 than for any previous year since 1865.

The reason is obvious. The proportional number of adults of strictly foreign birth, among the so called foreign population, is rapidly decreasing; diminished by lessened immigration and by death.

The number of those in the periods of life in which the marriage relation is most frequently assumed, is fast diminishing from advancing age. The number of marriages of persons of purely foreign birth must, therefore, under the existing order of events, continue to decrease, while the number of those born of parents of foreign birth, but are of themselves of American birth, and rapidly attaining the marriageable age, are steadily increasing, and must continue to help swell the number of marriages of native citizens.

There has been a gradual increase in the number of mixed marriages, though in a somewhat irregular manner, during the whole period of the registration of the same. It is an evidence that the caste prejudice of nationality is gradually diminishing.

In the following Table are given the percentages of American, foreign and mixed marriages in several years, and in the aggregate for the twenty years, 1858 to 1877, inclusive. By *mixed* marriages are meant those where one party was of American and the other of foreign birth:

TABLE XXVII.

BIRTH PLACE.	1878.	1877.	1876.	1875.	1874.	1873.	1872.	1871.	1870.	1868.	1866.	1864.	20 yrs. Total.
United States	62.60	61.66	62.23	59.04	58.84	61.60	58.65	60.06	60.50	64.06	62.21	63.33	61.33
For. Countries	21.22	21.73	22.77	24.70	27.35	26.69	27.20	26.75	26.88	22.62	25.84	25.64	26.19
Mixed.....	16.18	16.61	15.00	16.26	13.81	11.71	14.15	13.19	12.62	13.80	11.95	11.03	12.48
Total.....	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

It will be observed that the number of marriages of persons of American birth, in 1878, is not only larger than in the two previous years, but that the percentage, in comparison with all others, is larger than for any year since 1868.

It will be seen, also, that the marriages of persons of foreign birth have gradually decreased in percentage as well as in number, while the marriages of those of mixed nativity have as gradually increased in percentage.

In comparison with the average of twenty years, the percentage of marriages of persons of strictly American birth is somewhat larger; the percentage of those of mixed nationality is larger by about 30 per

cent., while the percentage of marriages of persons of strictly foreign nativity has decreased nearly 20 per cent.

AGES OF PERSONS MARRIED.

The number of persons married in Rhode Island, during the year 1878, in the different periods of life, and the number of each sex, in each division of age, may be found in the following Table:

TABLE XXVIII.

1878.	Under 20.	20 to 25.	25 to 30.	30 to 35.	35 to 40.	40 to 45.	45 to 50.	50 to 55.	55 to 60.	60 to 65.	65 to 70.	70 to 75.	75 to 80.	Not stated.
Males.....	91	894	674	296	150	98	49	36	31	16	12	2	1	4
Females.....	527	968	449	175	109	64	25	13	8	4	5	....	3	4
Total.....	618	1,862	1,123	441	259	162	74	49	39	20	17	2	4	8

The curiosities of matrimonial alliances continue to be exhibited from year to year. By reference to the Registration returns the eccentricities of taste in regard to conjugal companionship are strikingly presented. For instance, three men between 55 and 60 years of age married women between 20 and 25; three of same age, married women between 25 and 30, and four of same age, married women between 30 and 35. But of greater singularity, are the instances of eleven women between the ages of 35 and 40, marrying men between 25 and 30; three between the ages of 40 and 45, marrying men between 25 and 30; one woman between 45 and 50, married a man between 25 and 30; one woman between 50 and 55, married a man between 30 and 35; and one woman between 60 and 65, married a man between 40 and 45.

The following Table shows the number of persons married in Rhode Island, including both sexes, in each division of ages, in each of the last thirteen years, from 1866 to 1878, inclusive:

TABLE XXIX.

YEARS.	Under 20.	20 to 25.	25 to 30.	30 to 35.	35 to 40.	40 to 45.	45 to 50.	50 to 55.	55 to 60.	60 to 65.	65 to 70.	70 to 75.	75 to 80.	80 to 85.	Not stated.
1866.	693	1,931	1,025	419	213	127	81	59	25	21	12	7	....	....	3
1867.	696	1,886	1,104	416	211	148	91	48	37	18	18	5	3	1	6
1868.	644	1,835	1,050	432	219	133	82	61	30	29	11	8	4	....	32
1869.	642	1,814	1,051	468	227	134	79	46	35	15	11	2	3	2	40
1870.	744	1,883	1,084	415	216	159	86	64	26	24	12	3	2	....	6
1871.	697	1,914	1,118	392	228	115	73	56	35	22	6	7	3	....	6
1872.	786	2,073	1,182	434	237	131	81	61	43	21	13	6	1	....	5
1873.	762	2,177	1,156	507	253	140	87	68	35	24	12	6	6	....	27
1874.	770	1,992	1,179	459	268	159	101	52	36	39	8	9	1	....	9
1875.	681	2,058	1,108	475	252	150	101	60	32	29	13	4	1	....	6
1876.	691	1,741	1,041	450	224	154	80	53	27	19	12	3	2	....	9
1877.	631	1,745	1,118	459	244	125	92	52	46	14	15	11	2	1	9
1878.	618	1,832	1,123	441	259	162	74	49	39	20	17	2	4	....	8

The number of persons married in 1878, under twenty years of age, was less than in any one of the preceding twelve years; of those between 20 and 25 years there were 87 more than in 1877, and 91 more than in 1876. The number is larger than in 1877, in the third, fifth, sixth, tenth, eleventh, and thirteenth divisions of age. The number between 35 and 40 is the largest, with one exception, and between 40 and 45, without exception, in the last thirteen years; and between 70 and 75 the smallest, with one exception, for the same period.

PROPORTION OF SEX.

The following Tables will show the percentages of males and females married, in each division of ages, in each of the last nineteen years:

TABLE XXX.

YEARS.	MALES.						Total.
	Under 20.	20 to 25.	25 to 30.	30 to 40.	40 to 50.	50 & over.	
1860.....	5.0	42.8	26.9	16.3	5.7	3.3	100.00
1861.....	4.6	44.5	25.4	15.5	5.8	4.2	100.00
1862.....	4.2	37.8	27.9	18.8	5.9	5.9	100.00
1863.....	3.5	38.0	29.6	17.2	5.8	5.9	100.00
1864.....	4.3	38.8	27.8	17.9	7.4	4.8	100.00
1865.....	3.5	37.0	28.4	18.9	7.5	4.7	100.00
1866.....	5.3	40.9	27.0	16.4	6.8	4.1	100.00
1867.....	4.3	40.1	27.9	16.8	6.8	4.1	100.00
1868.....	4.1	39.9	28.2	17.1	6.1	4.6	100.00
1869.....	4.3	39.6	27.7	18.5	6.1	3.8	100.00
1870.....	4.8	40.4	28.1	16.0	6.4	4.3	100.00
1871.....	5.3	40.1	28.9	16.5	4.9	4.3	100.00
1872.....	4.3	41.3	28.2	16.6	5.2	4.4	100.00
1873.....	3.8	42.4	26.7	17.0	6.0	4.1	100.00
1874.....	4.1	40.4	27.2	17.5	6.4	4.4	100.00
1875.....	3.5	40.9	27.8	17.5	6.1	4.2	100.00
1876.....	5.1	37.5	28.6	17.9	5.6	4.3	100.00
1877.....	4.3	36.0	30.2	18.7	5.9	4.9	100.00
1878.....	3.9	38.5	29.0	18.0	6.3	4.3	100.00

TABLE XXXI.

YEARS.	Under 20. 20 to 25. 25 to 30. 30 to 40. 40 to 50. 50 & over.						Total.
	Under 20.	20 to 25.	25 to 30.	30 to 40.	40 to 50.	50 & over.	
1860.....	25.8	44.1	17.0	9.1	2.6	1.4	100.00
1861.....	29.6	42.0	15.2	7.8	4.1	1.3	100.00
1862.....	24.9	41.8	16.7	11.8	4.1	1.2	100.00
1863.....	24.9	42.6	16.9	9.8	4.1	1.7	100.00
1864.....	24.2	43.4	17.8	10.3	2.9	1.4	100.00
1865.....	22.6	42.8	19.1	11.0	3.5	1.5	100.00
1866.....	24.7	42.9	17.4	11.0	2.7	1.3	100.00
1867.....	25.4	40.5	19.3	10.0	3.4	1.4	100.00
1868.....	24.4	40.9	18.1	11.6	3.3	1.7	100.00
1869.....	24.1	40.5	18.7	12.1	3.4	1.2	100.00
1870.....	26.8	39.4	17.9	10.8	3.9	1.2	100.00
1871.....	24.6	41.9	19.1	10.1	3.1	1.2	100.00
1872.....	26.7	40.5	18.4	9.9	3.2	1.3	100.00
1873.....	25.3	40.8	17.5	12.0	2.7	1.7	100.00
1874.....	26.3	38.1	19.3	11.1	3.9	1.3	100.00
1875.....	23.9	42.1	16.8	11.8	4.0	1.4	100.00
1876.....	25.6	39.8	17.6	12.0	3.7	1.3	100.00
1877.....	23.4	40.4	18.8	12.1	3.6	1.7	100.00
1878.....	22.7	40.4	19.8	12.2	3.8	1.6	100.00

The great difference between the number of males and the number of females who enter the marriage state under the age of 20 years, as shown in the above Tables, will not fail to be noticed. In the year 1878, for every 4 males married under 20 years of age, there were nearly 23 females married under the same age.

In the second division, i. e. from 20 to 25 years of age, the percentages for 1878 approximate very closely, standing about 38 males to 40 females. In the third division, i. e. from 25 to 30, they again diverge, standing for the same year at about 150 males married to each 100 females. The same proportion also holds for the division of ages from 30 to 40. After 40 years of age, the percentage of males married increases to one, two, and in some years, even three hundred per cent. above that of females.

Of all the persons married during any one of the last nineteen years, there has been no year in which there were as many as six males, above 50 years of age married, in each 100 marriages; nor any year in which there were as many as two females, above the same age, married, in each 100 marriages.

COLORED MARRIAGES.

There were 80 marriages of persons of color in Rhode Island during the year 1878.

The whole number is 16 larger than in 1877, and 21 larger than in 1876. It may be of interest to see what the proportion of colored persons married in 1876, 1877 and 1878, bears each year to the whole number of colored persons in the State, and also the proportions of the same compared with the proportions which the whole number of persons married bears to the whole population of the State, for the same periods of time.

	1878.	1877.	1876.
Ratio of whole number of persons married to whole population of the State.	One in every	One in every	One in every
.....	55.7.....	56.6.....	57.8.....
Ratio of colored persons married to whole of colored population in the State.			
.....	39.1.....	49.0.....	53.1.....

It will be seen by the above comparisons, that the ratio of marriage to population, according to the Census of 1875, has steadily increased during the last three years, in both white and colored classes of the population, and that the increase has been much the largest in the colored population. Indeed it is doubtless true that the marriage rate of the whites, has not increased as fast as the population. A further consideration of the status of the colored population, in regard to the proportion of births, marriages and deaths, will be given in the chapter devoted to the statistics of mortality.

DIVORCES, 1878.

The question of divorce has no direct relation to the status of the public health, but has always a place in the compilation of vital statistics, and has also an element of interest to all, from its connection with the marriage relations of the people.

The number of applications for divorce, in 1878, was 258; which was 1 more than in 1877.

The following Table shows the number of divorces granted in each county, and in the whole State, in each of the last ten years, with the proportion of marriages to each divorce granted, in each year:

TABLE XXXII.

YEARS.	Bristol County.		Kent County.		Newport County.		Providence County.		Washington County.		Whole State.	
	Divorces Granted.	Marriages to one Divorce.	Divorces Granted.	Marriages to one Divorce.	Divorces Granted.	Marriages to one Divorce.	Divorces Granted.	Marriages to one Divorce.	Divorces Granted.	Marriages to one Divorce.	Divorces Granted.	Marriages to one Divorce.
1869	10	10.6	15	12.5	6	27.7	120	13.8	11	15.5	162	14.1
1870	3	27.7	18	11.8	6	26.8	152	11.3	21	9.3	200	11.8
1871	5	16.8	11	17.9	4	49.7	123	13.8	18	11.4	161	14.5
1872	8	10.2	13	15.7	8	22.9	149	12.6	22	8.9	200	12.7
1873	6	16.2	22	9.8	8	21.9	131	14.8	6	33.7	173	15.2
1874	10	8.9	20	8.0	6	29.0	190	10.0	16	11.6	242	10.5
1875	2	50.0	18	8.8	7	23.4	120	14.9	11	20.5	158	15.7
1876	6	14.5	15	12.8	7	20.5	148	11.1	20	8.8	190	11.5
1877	7	12.0	9	16.3	7	26.0	134	12.4	21	9.9	178	12.8
1878	4	26.0	11	13.3	13	12.8	156	10.9	12	17.3	196	11.9

The number of divorces granted in 1878, was 18 larger than it was in 1877; and the proportion of marriages to divorces was slightly decreased.

DEATHS, 1878.

The number of deaths reported in the State of Rhode Island during the year 1878, was 4,441. This number is less than that of 1877, by 9 only, and is larger than any previous year, with the exception of 1877.

The rate of mortality for the year, as already given on page 60, was one to every 58.10 of the population, according to the Census of 1875, or at the rate of 17.20 in each thousand.

By reference to Table XII, page 63, the difference between the previous three years can be readily seen. The percentage and death rate, are almost precisely what they were in 1877, but differ more with the smaller number of 1876, when the death rate was one decedent to every 62.7 of the population, or 15.9 in each one thousand.

It may be of interest to the reader, to contrast the number of deaths in the city of Providence, with those that occurred in the rest of the State, for the purpose of showing the difference in the rate of mortality, between city life under favorable circumstances, and life in villages and rural districts.

In order to bring before the eye in a more direct manner, the comparisons alluded to, the following synopsis for the years 1876, 1877 and 1878, is presented:

	Population.	Number of deaths.	One death in every	In each 1,000.
1876.	Providence City.....100,675.....	1,865.....	54.00.....	18.50
	Rest of State.....157,564.....	2,251.....	70.00.....	14.28
	Whole State.....258,239.....	4,116.....	62.70.....	15.90
1877.	Providence City.....100,675.....	1,988.....	51.90.....	19.25
	Rest of State.....157,564.....	2,512.....	62.70.....	15.94
	Whole State.....258,239.....	4,450.....	58.30.....	17.20
1878.	Providence City.....100,675.....	1,969.....	50.62.....	19.59
	Rest of State.....157,564.....	2,452.....	64.26.....	15.56
	Whole State.....258,239.....	4,441.....	58.10.....	17.20

The observation has been frequently made, that the difference in mortality between the city and State, shown by the statistics of deaths as reported from the towns, could not be relied upon as entirely correct. It is believed that many of the villages of the State have quite as insalubrious surroundings as any parts of the city of Providence; and, although it is known that in the rural districts, at least, the percentage of children, in whom the mortality is largest, is much smaller than in the city, still, the rate of mortality could scarcely show so much disparity, if the whole number of deaths outside of the city, were fully reported.

There are three towns which reported a higher death rate for 1878, than the city of Providence, viz.: Warren, Woonsocket and East Providence. Doubtless the whole number of deaths in these towns were reported.

Doubtless, also, several of those towns showing a very small death rate, report the whole number of deaths, and especially the towns of Newport county, with a rate of only 9.5 in each one thousand. The failure to return the whole number of deaths, occurs mainly in those towns having a large manufacturing population, among which frequent removals are almost the rule, rather than exception, and where burial permits are not required. It is very certain that there will never be anything like complete returns of deaths, until burial permits are required in every town in the State.

SEX OF DECEDENTS.

Of the 4,441 persons, whose deaths were returned during the year 1878, 2,161 were males, and 2,280 were females; the ratio standing at 94.78 males to each 100 females, or 48.66 males, and 51.34 females in each 100 decedents.

The following Table shows the number and proportion of males and females among the decedents, and also among the children born in Rhode Island, during the ten years, 1853 to 1862, inclusive; also in each of the sixteen years from 1863 to 1878, inclusive, and for the entire period of twenty-six years:

TABLE XXXIII.

DEATHS.	10 years, 1853-1862.....	10,980 males.....	11,969 females.....	or	96.9 males to 100 females.
	1863.....	1,631 males.....	1,566 females.....	or	102.3 males to 100 females.
	1864.....	1,633 males.....	1,727 females.....	or	94.5 males to 100 females.
	1865.....	1,686 males.....	1,719 females.....	or	98.1 males to 100 females.
	1866.....	1,497 males.....	1,473 females.....	or	101.6 males to 100 females.
	1867.....	1,442 males.....	1,447 females.....	or	99.7 males to 100 females.
	1868.....	1,418 males.....	1,499 females.....	or	94.3 males to 100 females.
	1869.....	1,696 males.....	1,686 females.....	or	100.6 males to 100 females.
	1870.....	1,588 males.....	1,650 females.....	or	96.2 males to 100 females.
	1871.....	1,631 males.....	1,723 females.....	or	94.1 males to 100 females.
	1872.....	2,118 males.....	2,129 females.....	or	99.4 males to 100 females.
	1873.....	2,166 males.....	2,237 females.....	or	95.5 males to 100 females.
	1874.....	2,111 males.....	2,118 females.....	or	99.7 males to 100 females.
	1875.....	2,108 males.....	2,209 females.....	or	95.4 males to 100 females.
	1876.....	1,969 males.....	2,147 females.....	or	91.7 males to 100 females.
	1877.....	2,132 males.....	2,318 females.....	or	92.0 males to 100 females.
	1878.....	2,161 males.....	2,220 females.....	or	94.8 males to 100 females.
	26 years.....	39,992 males.....	41,217 females.....	or	96.8 males to 100 females.

TABLE XXXIV.

BIRTHS.	10 years, 1853-1862.....	18,377 males.....	17,260 females.....	or	106.4 males to 100 females.
	1863.....	1,892 males.....	1,788 females.....	or	105.8 males to 100 females.
	1864.....	1,940 males.....	1,942 females.....	or	100.3 males to 100 females.
	1865.....	2,096 males.....	1,887 females.....	or	112.9 males to 100 females.
	1866.....	2,546 males.....	2,356 females.....	or	108.1 males to 100 females.
	1867.....	2,655 males.....	2,464 females.....	or	107.7 males to 100 females.
	1868.....	2,745 males.....	2,627 females.....	or	104.5 males to 100 females.
	1869.....	2,635 males.....	2,560 females.....	or	104.9 males to 100 females.
	1870.....	2,679 males.....	2,536 females.....	or	105.6 males to 100 females.
	1871.....	2,878 males.....	2,800 females.....	or	102.8 males to 100 females.
	1872.....	3,085 males.....	3,058 females.....	or	100.9 males to 100 females.
	1873.....	3,135 males.....	2,887 females.....	or	108.6 males to 100 females.
	1874.....	3,311 males.....	3,155 females.....	or	104.9 males to 100 females.
	1875.....	3,362 males.....	3,146 females.....	or	106.9 males to 100 females.
	1876.....	3,291 males.....	3,088 females.....	or	106.8 males to 100 females.
	1877.....	3,163 males.....	3,072 females.....	or	108.0 males to 100 females.
	1878.....	3,402 males.....	3,312 females.....	or	102.7 males to 100 females.
	26 years.....	63,251 males.....	59,858 females.....	or	105.7 males to 100 females.

There were 29 more males, and 38 less females, among the decedents of 1878, than in the year 1877, and the proportion of males to females

was greater, and thereby more nearly equal as compared with the preceding year.

Among the children born there were 239 more males, and 240 more females than in 1877, the inequality of proportion being less than in the previous year, or in any previous year, with the exception of 1864, and 1872.

It will be noticed upon examination of the above Tables, that in the aggregate for the twenty-six years, and also in all of the separate years given, with two or three exceptions, there has been an excess of females among the decedents, and an excess of males among the children born.

A natural inference would be, that the male portion of the population must be largely in excess of the female portion, and annually increasing.

By reference to Table V, page 28, it will be seen, however, that by the Census of 1875, the females exceeded the males in the population of the State, by 7,119. The difference must be accounted for on the supposition of a larger proportional emigration of native males from the State.

SEASON AND MORTALITY.

The whole number of decedents, and the sex of the same, in each month of the year 1878, and in each division of the State, may be found in Table IV, on the 23d page.

The influence of season upon mortality, may be further illustrated by the following Table, which shows the number and percentage of deaths, in each quarter of each of the last five years, and in the aggregate for the twenty-one years, from 1853 to 1873, inclusive.

TABLE XXXV.

SEASON.	1878.		1877.		1876.		1875.		1874.		1853-1873.	
	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.
January—March...	1,158	25.87	986	21.08	948	23.03	1,101	25.50	977	23.10	13,784	23.12
April—June.....	968	21.81	968	21.53	942	22.89	912	21.13	1,045	24.71	12,656	21.23
July—September...	1,175	26.46	1,317	29.60	1,249	30.34	1,244	28.82	1,185	28.02	18,460	30.98
October—December	1,140	25.86	1,239	27.84	977	23.74	1,060	24.55	1,022	24.17	14,708	24.67
Total.....	4,441	100.00	4,450	100.00	4,116	100.00	4,317	100.00	4,229	100.00	59,617	100.00

It will be observed that the percentage of mortality, in 1878, was greater than that of 1877, in the first two quarters of the year, and less in the last two quarters. It was also greater in the first quarter of 1878, than in the first quarter of either of the previous four years, and greater than the average percentage of the same season, for the twenty-one years preceding 1874. The percentage of the third quarter for 1878, although following the rule of being larger than in any other quarter, was less than in the same quarter of any one of the previous four years, and also considerably less than the average of the same quarter for the twenty-one years preceding 1874.

The percentage of the fourth quarter, as will be seen, was less than the first, which is contrary to the general rule; and quite reverses the proportions of 1877, in which the last quarter had a very large percentage in excess of the first.

It may be of interest to contrast the city of Providence, which comprises about two-fifths of the entire population of the State, with the rest of the State, in regard to the influence of season upon mortality.

The following Table will present a comparison between the city and rest of the State, in relation to the mortality of each section by seasons.

It will show the number and percentage of deaths in each quarter of the year 1878, in the city, and in the rest of the State separately; and also the percentage of deaths in each quarter of the year, in the city of Providence, for twenty-four years, from 1855 to 1878, inclusive; and in the whole State, including the city, for twenty-six years, from 1853 to 1878, inclusive:

TABLE XXXVI.

SEASON.	1878.				1855-1878.		1853-1878.	
	Providence.		Rest of State.		Providence.		Whole State.	
	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.
January—March.....	541	27.19	617	25.16	7,519	23.89	18,904	23.28
April—June.....	423	21.28	545	22.22	6,909	21.98	17,481	21.53
July—September.....	520	26.14	655	26.71	9,353	29.76	24,639	30.37
October—December.....	505	25.39	635	25.91	7,968	24.42	20,146	24.89
Total.....	1,989	100.00	2,452	100.00	31,464	100.00	81,170	100.00

A contrast between the city of Providence and the rest of the State, in regard to *habits* and *modes* of life, does not present such marked differences as, perhaps, might be expected. The great proportional number, and near contiguity of the villages of Rhode Island, with their facility of access, and the frequent communication of residents therein with each other, and with the city of Providence, make the entire population more homogeneous in character than that of any other State. Then the city of Newport, and several villages large enough for incorporation into cities, and a considerable number but little less in size, present all the essential conditions of city life in their sanitary relations, as well as in the customs and modes of living of the inhabitants. Under these circumstances, it would not be expected that there would be any great difference in the percentage of mortality, in the same quarters of the year, between the city of Providence and the rest of the State, in the average of a series of years.

An examination of Table XXXVI will show that such is the fact. While there are considerable differences in some years, between the city and rest of the State, and between the city and the whole State, including the city, in the same quarters, it will be seen, that for a period of twenty-four or more years, the average percentage in the same quarters, between the city and the whole State does not in any instance reach as high as three-quarters of one per cent.

Of course the exact difference is not shown, because the death statistics of the city are merged in those of the State, but the result is sufficiently conclusive in establishing the fact that whatever difference there may be, it does not exceed one per cent. in the average of any lengthened period of time.

As before observed, for single years there may be considerable differences, as in the year 1878, in which it will be noticed that in the first quarter, the difference between the city and rest of the State was 2.03 per cent. in favor of the rest of the State, while in the remaining three quarters the difference was in favor of the city as follows:—2d quarter 0.94 per cent.; 3d quarter 0.57 per cent.; 4th quarter 0.52 per cent.

The following summary shows the order of the months in which occurred, from the largest to the smallest number of deaths in the whole State, in each of the last five years:

	1878.	1877.	1876.	1875.	1874.
1	December... 431	September.. 454	August..... 469	August.... 471	August..... 496
2	August..... 420	August..... 450	July..... 444	September.. 419	September.... 386
3	July..... 410	October.... 430	December.. 348	February... 392	April..... 384
4	January... 400	July..... 413	March.... 341	January... 368	July..... 363
5	March 396	December.. 411	September. 336	December.. 358	October..... 359
6	November.. 377	November.. 398	October.... 334	November.. 357	May..... 352
7	February.... 362	March..... 347	May..... 332	July..... 354	January..... 351
8	April..... 350	May..... 348	April..... 329	March..... 346	December.... 339
9	September.. 345	January.... 323	February... 312	October.... 345	November.... 324
10	October.... 342	April..... 310	January... 295	May..... 333	March..... 320
11	June..... 310	June..... 305	November.. 295	April..... 314	June..... 309
12	May..... 308	February... 266	June..... 281	June..... 265	February..... 306
	4,441	4,450	4,116	4,317	4,229

For the first time since 1864, in which year the summarising by order of months and highest mortality commenced, December takes first place. This bad eminence has almost invariably been held by August, and was in 1878 displaced by only a single death. The change of place, however, has not occurred solely from an increased number of deaths in December, but in a larger degree to a decreased number of deaths in August as compared with the year 1877. There was no largely increased mortality from any one disease in December 1878, with the exception of Pneumonia, but in August the decrease in the number of deaths from cholera infantum and diarrhoea was 40 per cent. less than in 1877.

It will be noticed that September, which took first position in 1877, fell to the ninth in order in 1878, the falling off in the deaths from cholera infantum and diarrhœa in that month as compared with the same in 1877, was more than 60 per cent. As usual, October, May and June, take low places.

The following summary taken from the report of the City Registrar of Providence for 1878, will show the number of deaths and the months in the order of highest occurrence of the same according to percentage in the city of Providence, in the aggregate of deaths for twenty-three years, from 1856 to 1878 inclusive:

TABLE XXXVII.

TWENTY-THREE YEARS. 1856-1878.	American Parentage		Foreign Parentage		Total American and Foreign.
	Number of Deaths.		Number of Deaths.		Number of Deaths.
1. August.....	1,499	1. August.....	1,733	1. August.....	3,232
2. July.....	1,857	2. July.....	1,624	2. July.....	2,981
3. September.....	1,841	3. September....	1,460	3. September....	2,801
4. January.....	1,340	4. October... ..	1,303	4. December....	2,531
5. December. ...	1,314	5. November....	1,218	5. January... ..	2,506
6. March.....	1,276	6. December....	1,217	6. October.....	2,438
7. April.....	1,254	7. April.....	1,188	7. April.....	2,440
8. February.....	1,225	8. January.....	1,166	8. March.....	2,438
9. November....	1,215	9. March.....	1,163	9. November....	2,433
10. October.....	1,185	10. February....	1,137	10. February....	2,362
11. May.....	1,165	11. May... ..	1,081	11. May... ..	2,346
12. June.....	985	12. June.....	1,030	12. June.....	2,015
Total.....	15,156	Total.....	15,317	Total.....	30,473

The above synopsis shows very clearly in the third column the order of the months in which the total deaths have occurred, from the highest to the lowest number of the same in the city for a long series of years. It does not differ materially in the order of months from a summary of the same kind for the whole State for a long period of years.

It will be noticed, however, that the two classes of parentage differ somewhat in agreement with each other, and with the monthly order of mortality in the total number of deaths.

The agreement between the two classes of parentage is complete, the one with the other for just half the months of the year. The agreement of each class of parentage with the order of total number is complete for seven months in the twelve.

PARENTAGE OF DECEDENTS.

The whole number of decedents reported in Rhode Island in 1878, was 4,441 of which 2,281 were of American parentage, and 2,160 were of foreign parentage. The parentage was reckoned according to the reported nativity of the fathers.

A general abstract of deaths by parentage in the several towns in the State will be found in Table I on pages 18 and 19.

There were no decedents of foreign parentage reported in 1878 from six towns in the State, and in eight towns, the number of decedents of foreign parentage were 3 or less.

There were seven towns in which the number of decedents of foreign parentage exceeded those of American. In Cranston, the numbers were equal. In Burrillville, there were twice as many of foreign parentage as of American; in Cumberland, nearly twice as many; in Lincoln, two and one-quarter times as many, and in Woonsocket nearly three times as many.

In Providence city, the decedents of foreign parentage exceeded those of American by 211, or about 123 of foreign to each 100 of American parentage.

The following Table gives the number and percentage of decedents of American and of foreign parentage, in each of the last five years, and in the aggregate for twenty years previous to 1878, or from 1858 to 1877 inclusive:

TABLE XXXVIII.

PARENTAGE.	1873.		1877.		1876.		1875.		1874.		1858-1877.	
	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.
American.....	2,281	51.36	2,279	51.21	2,150	52.24	2,466	57.12	2,282	54.10	38,580	57.00
Foreign.....	2,100	48.64	2,171	48.79	1,906	47.76	1,851	42.88	1,947	45.90	28,429	42.40
Total.....	4,441	100.00	4,450	100.00	4,116	100.00	4,317	100.00	4,229	100.00	67,009	100.00

It will not fail to be noticed upon examination of the above Table, that the difference in number and percentage between the decedents of American and foreign parentage has been steadily lessening. Previous to 1877, the percentage of decedents of foreign parentage had not *averaged* for the period of nineteen years as high as 42.00 per cent. It will now be seen that the foreign percentage has *averaged* more than 46.00 per cent. for the last five years and has nearly reached 49.00 per cent. during the years 1877 and 1878.

AGE OF DECEDENTS.

A statement of the aggregate and average age, of all the reported decedents of each sex, in each town and county in the State in 1878, may be found in Table I, on pages 18 and 19.

It will there be seen that the average age of all the male decedents in 1878, was 29.02 years, and the average age of all the female decedents, was 31.11 years.

The average age of all the male decedents in 1877, was 29.25 years, and of female decedents, 31.56 years. The highest average age of male decedents, in any town in the State in 1878, was 62.00 years, in New Shoreham; the lowest average age of male decedents in same year, was 11.33 years, in Middletown. The highest average age of female decedents in 1878, was 83.00 years, in Jamestown, and the lowest average of females, was 7 25 years, in North Providence. The averages for single years in towns having a small population, have very little value as indicating the relative longevity of the inhabitants.

When the deaths are few in number, they may happen in the same year to be of elderly people of one sex, and of a youthful age in the

other. And in the different years the decedents may be of advanced age in both sexes in one year, and of earlier age in another year. As in Jamestown in 1878, there was one female decedent only, aged 83 years, and three male decedents whose average age was 57 years, while in the same town in 1877, the average age of male decedents was 5 years, there being but one death among the males, and the average age of female decedents in 1876, was 16 years, there being two female decedents. But when aggregated in counties, and in towns of large population the averages from year to year do not very widely differ.

In the city of Providence, the average age of male decedents, in 1878, was 24.22 years, the average age of female decedents 27.88 years. The average age of total male and female decedents in the city was 26.09 years.

The following Table shows the average age of the decedents, in each of the larger divisions of the State, in each of the last five years, and also in the aggregate of each of four periods of five years each, comprising the twenty years from 1858 to 1877, inclusive:

TABLE XXXIX.

DIVISIONS OF THE STATE.	1878.	1877.	1876.	1875.	1874.	1873-1877. 5 years.	1868-1872. 5 years.	1863-1867. 5 years.	1858-1862. 5 years.
Bristol County	29.08	32.19	39.53	29.90	33.09	33.61	35.12	34.78	35.56
Kent County.....	33.68	35.78	39.39	35.77	32.06	36.20	34.77	35.81	32.15
Newport County.....	39.06	43.96	39.17	45.94	43.94	40.68	40.04	33.54	35.01
Providence Co., Towns.	30.98	28.16	31.69	30.19	28.66	28.46	25.26	29.16	28.44
Providence City.....	26.09	27.74	28.41	28.57	26.90	27.19	25.45	28.50	25.78
Washington County....	42.84	43.68	43.09	37.17	40.78	41.14	39.67	30.87	34.21
Whole State.....	30.09	30.45	32.37	31.27	29.86	30.28	31.66	30.75	29.42

As will be seen by Table XXXIX, the average age of the total decedents of the State, in 1878, was not only less than the average in 1877, but was less than in either of the three preceding years, and also less than the average for the previous twenty years. The difference, however, in the average age of total decedents, in any one year with another, or with any period of years, has not exceeded the limits of the last three years.

In the counties, as previously remarked, the differences, for obvious reasons, are quite considerable, although less than in most years.

PERCENTAGES OF DECEDENTS AT DIFFERENT AGES.

In Table V, on pages 24 to 29, inclusive, will be found the number of deaths in 1878, in each town and each county, of each sex, and in each period of life, with the percentage of the whole number of deaths in each division, to the population of the same.

The following Table shows the percentages of decedents in each division of ages in each of the last ten years, and in the aggregate for two periods: one of ten years and seven months, from June 1st, 1853, to December 31st, 1862, inclusive; the other of ten years, from 1863 to 1872, inclusive:

TABLE XL.

PERIODS OF LIFE.	1878.	1877.	1876.	1875.	1874.	1873.	1872.	1871.	1870.	1869.	10 yrs. 1863- 1872.	10 yrs. 7 mos. 1853- 1862.
Under 1 year....	16.6	17.4	19.5	20.8	19.9	19.3	22.8	18.8	20.0	17.8	18.0	17.6
1 and under 2....	8.1	8.1	7.4	6.8	7.8	9.2	8.0	6.1	7.2	8.1	7.8	9.8
2 and under 5....	10.3	9.5	7.0	7.0	9.4	8.1	5.5	6.7	6.2	8.8	7.9	9.6
Total under 5....	35.0	35.0	33.9	34.6	37.1	36.6	36.3	31.6	33.4	34.7	33.7	37.0
5 and under 10...	6.2	6.2	4.2	4.0	5.7	5.3	2.7	3.3	3.3	5.7	4.6	5.0
10 and under 20...	6.1	5.4	5.2	5.5	6.0	6.9	6.5	5.5	6.6	6.9	6.2	5.8
20 and under 30...	8.8	8.9	9.1	9.6	8.7	9.1	9.9	10.2	10.3	8.8	9.7	9.5
30 and under 40...	7.6	7.5	7.7	7.9	6.9	7.8	8.5	8.4	7.9	6.8	8.1	8.7
40 and under 50...	6.4	6.6	6.9	7.7	6.8	6.5	7.3	7.5	7.1	7.4	7.2	7.5
50 and under 60...	7.6	7.2	7.5	7.4	7.0	6.4	6.7	7.6	7.3	7.9	7.3	6.7
60 and under 70...	7.9	8.8	9.3	8.6	7.8	7.6	8.2	8.9	8.5	8.1	8.3	6.9
70 and under 80...	8.8	9.5	9.8	8.4	8.1	8.3	7.7	9.8	9.1	8.1	8.4	7.3
80 and under 90...	4.8	4.0	5.2	5.0	4.7	4.5	5.4	6.0	5.7	4.7	5.4	4.6
90 and over.....	0.8	0.9	1.2	1.3	1.2	1.0	0.8	1.2	0.8	0.9	1.1	1.0
Total.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

In Table XXXIX, it was shown that the average age of the total decedents in Rhode Island, in 1878, was less than in either of the previous three years. The lessened average age in any year, is usually owing to the larger decedence of childhood and youth.

As compared with the previous year, the slightly lessened rate of mortality in 1878, was not owing to a smaller number of deaths among children of five years and under, as usual, but principally, as will be seen in Table XL, to an increased mortality between the ages of 10 and 20.

The results of a single year, however, or of two or three years, have little value in arriving at definite conclusions. The occurrence of one or more epidemics in one year, affecting children chiefly, and the occurrence in another year of epidemics affecting adults chiefly, or all ages alike, would make great differences in the ratio of mortality in the different periods of life, in short terms of years. But in periods of twenty years, or more, the results may be considered as reasonably conclusive.

It will be seen by the preceding Table, that the average percentage of mortality of children of five years of age and under, in Rhode Island, for a period of sixteen years, has not exceeded 36 per cent. This is a low rate as compared with the statistics of some other States, in which the rate is stated to be as high as from 40 to 42 per cent.

The different localities of the State also present marked differences in the percentage of mortality in the different divisions of age, as well as in the average age.

In the strictly rural districts, where the proportion of children to the adult population is much less than in the larger villages and cities, where the most of those in the child-bearing periods of life gravitate, the average age is not only larger for a series of years, but the percentage of mortality in the earlier years of life is relatively much smaller.

In order to show concisely the differences alluded to in the above remarks, the following representative sections of the State are presented, and the percentages of decedents, in 1878, in the different periods of life in those towns, are contrasted; and in the city of Providence a contrast of the same, between the different general classes of the population.

It is understood the percentages are the ratios of the number of decedents in each of the divisions of age, compared with the whole number of decedents, in the respective towns, and not with the population.

1878.		Under 1 year. Per cent.	Under 5 years. Per cent.	5 to 20. Per cent.	20 to 50. Per cent.	50 & over. Per cent.
State of Rhode Island,	Males.....	9.3.....	18.6.....	5.3.....	10.2.....	14.6-48.7
	Females.....	7.3.....	16.4.....	7.0.....	12.6.....	15.3-51.3
Total.....		16.6	35.0	12.3	22.8	29.9
						100.0
Jamestown.....		00.0.....	00.0.....	00.0.....	25.0.....	75.0
						100.0
New Shoreham..		11.0.....	11.0.....	00.0.....	11.0.....	78.0
						100.0
Foster.....		06.0.....	06.0.....	00.0.....	25.0.....	69.0
						100.0
Warren.....		10.6.....	35.3.....	20.0.....	21.0.....	23.7
						100.0
Woonsocket.....		27.5.....	41.8.....	10.8.....	23.7.....	23.7
						100.0
City of Providence,	Am. Parentage.....	8.45.....	16.44.....	5.60.....	8.80.....	18.88-44.72
	For. Parentage.....	10.31.....	23.58.....	7.12.....	14.33.....	10.35-33.23
Total Percentage.						
Providence.....		18.76.....	40.02.....	12.72.....	23.13.....	34.13
						100.0

The above summary will serve to show how greatly the percentages differ in the different towns in the different divisions of age; and in the city of Providence, the difference in the percentages of the two principal classes of the population.

In the town of Jamestown it will be seen that there were no deaths in 1878, of persons under twenty years of age, and that, therefore, the percentage would necessarily be large in the later periods of life.

The difference of percentage under one year of age, varies from .00 in the town of Jamestown, to 27.5 in the town of Woonsocket.

Under five years of age the average percentage to whole number of decedents, in the whole State, was 35.0 per cent., and which was the same as in 1877; under one year of age, 16.6 per cent. or 0.8 per cent. less than in 1877.

The high death rate of 41.8 per cent. of persons under five years of age in Woonsocket, leads all others, in 1878, although less by 1.19 per cent. than in 1877. The percentage of Providence city, 40.2 per cent., is considerably larger than in 1877.

The difference between Providence and Woonsocket, in the percentage of decedents under one year of age, in 1878, is quite remarkable, that is, Woonsocket, 27.5 per cent.; Providence, 18.76 per cent., or 8.74 per cent. less.

In both towns more than one-half of all the deaths was of persons not over twenty years of age, and more than four-fifths of that proportion, of persons under five years of age. The difference in the percentages of the decedents under five years of age, of American parentage and of foreign parentage, in the city of Providence, will be noticed. This difference, 7.14 per cent., in 1878, is less than in either of the two preceding years.

Of decedents 50 years of age, and over, the percentage varies from 23.7 in Warren and Woonsocket, to 78.0 per cent. in New Shoreham.

COLORED DECEDENTS.

Considerable public interest has been manifested in the question, whether the colored race was self-sustaining, in regard to population, in the colder latitudes of America. A comparison of the births and deaths among this class of people, for a long series of years, in the different States, will be of value in obtaining correct conclusions.

In the State of Rhode Island there is a large proportional number of colored people, as compared with other Eastern States, and the statistics in regard to births, marriages and deaths among them, have, for obvious reasons, been reported separately for a considerable number of years.

The number of deaths among the colored population, in 1878, was 156, or four less than in 1877.

Sex.—Of the 156 colored decedents, 63 were males and 93 females.

Season.—These 156 deaths were in the different months, as follows:

Months.	Deaths.	Months.	Deaths.	Months.	Deaths.	Months.	Deaths.
January.....	15	April.....	17	July.....	19	October.....	16
February.....	11	May.....	9	August.....	12	November.....	8
March.....	12	June.....	9	September.....	8	December.....	20
1st Quarter.....	38	2d Quarter.....	35	3d Quarter.....	39	4th Quarter.....	44

First six months, 73; second six months, 83. Total, 156.

Age.—The average age of the colored decedents in Rhode Island, in 1878, was as follows:

	Providence City.	Rest of State.	Whole State.
Colored Males.....	16.83 years	38.21 years	21.66 years.
Colored Females.....	31.07 years	33.46 years	31.97 years.

SUMMARY OF COLORED POPULATION.

The number of births, marriages and deaths among the colored population of Rhode Island, in the several divisions of the State, in 1878, is given in the following Table, compared with the colored population in each division, as found by the State census of 1875:

TABLE XII.

COUNTIES.	Colored Population, 1875.	BIRTHS, 1878.		MARRIAGES, 1878.		DEATHS, 1878.	
		Number.	To population one birth in	Number.	Of population one person married in	Number.	Of population one death in
Bristol County.....	249	8	31.1	..	..	6	41.5
Kent County.....	365	6	60.8	4	45.6	7	52.1
Newport County.....	1,021	27	37.8	10	51.0	17	60.0
Providence County, Towns.....	423	9	47.0	5	42.3	9	47.0
Providence City.....	3,487	104	33.5	54	32.3	106	32.9
Washington County.....	726	18	40.9	7	51.8	11	66.0
Whole State.....	6,271	172	36.4	80	39.2	156	40.2

In 1877, the proportions among the colored population were as follows: One birth in 37.3; one person married in 49.0; one death in 39.2.

The difference between the white and colored population, in the vital statistics of the year 1878, was as follows:

Whites.....One child born in 38.5; one person married in 56.1; one death in 54.8.
Colored.....One child born in 36.4; one person married in 39.2; one death in 40.2.

In regard to births and marriages, the numbers are larger in proportion to the population, among the colored than among the whites; and there was also a larger proportion of deaths among the former than among the latter.

The following summary shows the number of births, marriages and deaths among the colored population of Rhode Island in each of the last eighteen years, from 1861 to 1878, inclusive:

COLORED POPULATION.

1861.....	97 births.....	30 marriages.....	109 deaths.
1862.....	96 births.....	23 marriages.....	90 deaths.
1863.....	78 births.....	68 marriages.....	104 deaths.
1864.....	69 births.....	35 marriages.....	121 deaths.
1865.....	87 births.....	51 marriages.....	129 deaths.
1866.....	124 births.....	65 marriages.....	123 deaths.
1867.....	144 births.....	61 marriages.....	105 deaths.
1868.....	147 births.....	84 marriages.....	111 deaths.
1869.....	136 births.....	70 marriages.....	133 deaths.
1870.....	158 births.....	70 marriages.....	128 deaths.
1871.....	146 births.....	64 marriages.....	116 deaths.
1872.....	171 births.....	76 marriages.....	184 deaths.
1873.....	163 births.....	69 marriages.....	160 deaths.
1874.....	170 births.....	80 marriages.....	151 deaths.
1875.....	156 births.....	76 marriages.....	169 deaths.
1876.....	170 births.....	59 marriages.....	156 deaths.
1877.....	168 births.....	64 marriages.....	160 deaths.
1878.....	172 births.....	80 marriages.....	156 deaths.
<hr/>			
Total.....	2,447 births.....	1,125 marriages.....	2,405 deaths.

There were more births, more marriages and a less number of deaths in 1878 than in 1877; the number of births was 16 more than the number of deaths.

The circumstances favorable to the promotion of the physical health and vigor of the colored race, are believed to be, at least, quite as ample in Rhode Island, as in any other Northern or Eastern State. When we find that in a period of eighteen years, as seen in the synopsis above, the excess of births over the deaths, is only 42, and have full knowledge of the fact, that the State is having accession annually to the number of colored people by immigration, and that accession largely in the periods of life between 20 and 40 years, and of both sexes, we must conclude, however reluctantly, that the race is not self sustaining in this latitude.

There is always a tendency to reduce the number of facts relating to the colored population, by omitting to mark all the colored persons as colored. This source of error is constant, though constant care is taken to prevent it.

CAUSES OF DEATH, 1878.

The statistics of the causes of death in Rhode Island, in 1878, will be found in Tables VI, VII and VIII. The whole number of deaths, as previously stated, was 4,441. The number of which the cause of death was reported, was 4,231, and the number of which the cause was not stated, was 210. The number from unknown causes was 18 more than in 1877.

The following Table shows the number of deaths in 1878, in each larger division of the State, and the number and percentage in each division, of which the cause was unknown:

TABLE XLII.

1878.	Bristol County.	Kent County.	Newport County, Towns.	Newport City.	Providence County, Towns.	Providence City.	Washington County.	Whole State.
Number of Deaths.....	193	268	76	223	1,411	1,989	261	4,441
Cause not stated.....	6	39	2	32	103	16	12	210
One in.....	32.1	74.0	38.0	7.0	13.7	124.2	21.7	21.1

The returns of deaths, and especially the returns of the *causes* of deaths, are manifestly more incomplete than any other of the vital statistics of the State. That the *cause* of death in one out of every 21 decedents in the State, should be returned as unknown, is positive evidence that there is a defect in the Registration law, as well as proof that there is neglect of duty on the part of those who should observe the law as it stands. The remedy is in the enactment of a law for the State, such as is provided by municipal ordinance in the city of Providence, that is, the requirement of burial permits, and the pre-require-

ment of return of death, and *cause* of death when known. There is no reason why there should not be as many deaths in Providence city from causes unknown, as in other parts of the State, when as will be seen by Table XLII, the proportion for the whole State, including the city, is one in every 21.1, or nearly six times larger, and for the rest of the State, excluding the city, the proportion of deaths from unknown causes is one in 12.6 or about ten to every one returned from the city. A comparison of the returns of causes of death unknown in 1878, with those of 1877, show no improvement in respect to accuracy.

The following Table will present comparisons of one year with another for a considerable period of time.

TABLE XLIII.

Showing the proportion of Deaths reported, with cause "unknown," in each Division of the State, and in the whole State, in each of the last sixteen years, from 1863 to 1878, inclusive.

YEARS.	Bristol County.	Kent County.	Newport County.	Providence County, Towns.	Providence City.	Washington County.	Whole State.
1863, One in.....	16.5	11.2	25.5	6.9	46.7	24.7	14.7
1864, One in.....	57.0	12.6	11.6	8.5	45.7	47.6	16.1
1865, One in.....	64.8	27.4	18.4	8.2	55.0	32.9	16.4
1866, One in	163.0	11.4	22.4	9.5	45.0	23.8	17.3
1867, One in.....	.....	13.6	34.5	7.4	64.0	14.3	14.8
1868, One in.....	33.2	5.0	20.3	5.2	46.2	10.1	10.1
1869, One in.....	41.2	5.8	52.8	5.3	33.6	16.1	11.3
1870, One in.....	.....	19.3	23.6	11.8	90.2	26.9	23.6
1871, One in.....	151.0	31.2	7.9	8.4	33.6	9.8	13.0
1872, One in.....	13.3	5.8	10.0	6.8	72.8	9.8	11.3
1873, One in.....	.....	16.0	25.4	9.8	102.5	27.5	20.3
1874, One in.....	54.0	15.2	14.0	17.2	73.7	21.2	27.8
1875, One in.....	55.0	7.4	15.6	13.7	91.2	11.9	20.9
1876, One in.....	11.5	7.9	18.5	9.9	124.3	22.8	19.3
1877, One in .....	.....	17.7	9.7	11.9	323.0	16.0	23.2
1878, One in.....	32.1	74.0	9.0	13.7	124.2	21.7	21.1

It will be seen by the above Table, that great disparities in the number of deaths from unknown causes, are reported from year to year, from the different divisions of the State, and in the average of the whole State. For the whole State, the variation has been from one in every 10.1, in 1868, to one in every 27.8, in 1874.

In Bristol county, the variations have been from one in every 11.5, in 1876, to a complete return of the cause of every death in the county, in four of the sixteen years. Bristol county is the only one in the State that has reported the cause of every death in any year.

The variations in Kent county have been very considerable, that is, from one in every 5.0, in 1868, to one in 81.2, in 1871. Newport county, including the city of Newport, has varied from one in 7.9, in 1871, to one in 52.8, in 1869.

The difference between Newport county towns, and Newport city, as shown in Table XLIII, is seemingly evidence of neglect somewhere. It is hardly probable that one in every seven deaths in Newport city, was from cause unknown.

In Providence county towns the largest proportion was in 1868, *i. e.*, one in 5.2; the smallest in 1874, *i. e.*, one in 17.2. Providence city shows a variation from one in every 45.0, in 1866, to one in 323.0, in 1877. The small percentage of reported deaths from unknown causes in the city of Providence, is conclusive evidence of the efficiency of a law properly enforced, requiring certificates of cause of death, when known, and permission for burial or removal of the dead.

In Washington county, the proportions have varied from one in 9.8, in 1871 and 1872, to one in every 47.6, in 1864.

PRINCIPAL CAUSES OF DEATH.

The following Table gives the number of deaths in Rhode Island, from each of thirteen principal causes, showing the order in regard to number, in each of the last three years, and also in the aggregate of deaths for twenty-three years and seven months, from June 1st, 1852, to December 31st, 1875:

TABLE XLIV.

Showing the order in regard to number of deaths from thirteen principal causes of death.

1878.	1877.	1876.	June 1st, 1852, to Dec. 31st, 1875—23 yrs. 7 mos.
Whole Number....4,441	Whole Number....4,450	Whole Number....4,116	Whole Number....68,833
Consumption..... 676	Consumption..... 661	Consumption..... 665	Consumption..... 11,301
Diphtheria..... 435	Diphtheria..... 492	Pneumonia and Conges. of Lungs 339	Pneumonia and Conges. of Lungs 3,871
Pneumonia and Conges. of Lungs 317	Cholera Infantum. 259	Cholera Infantum. 250	Old Age..... 3,709
Old Age..... 222	Pneumonia and Conges. of Lungs 226	Old Age..... 241	Cholera Infantum. 3,493
Cholera Infantum. 168	Old Age... 213	Heart, Diseases of. 166	Scarlatina... 3,208
Heart, Diseases of. 166	Heart, Diseases of. 182	Apoplexy and Paralysis..... 165	Fevers, Typhoid, &c..... 2,692
Fevers, Typhoid, &c..... 150	Apoplexy and Paralysis..... 181	Diphtheria..... 159	Heart, Diseases of. 2,481
Accidents (all kinds)..... 122	Cancer (all kinds). 135	Fevers, Typhoid, &c..... 126	Apoplexy and Paralysis..... 2,233
Cancer (all kinds). 119	Fevers, Typhoid, &c..... 134	Accidents (all kinds)..... 114	Dysentery..... 1,975
Convulsions and Fits..... 112	Accidents (all kinds)..... 132	Cancer (all kinds). 106	Accidents (all kinds)..... 2,103
Apoplexy and Paralysis..... 102	Croup..... 95	Croup..... 102	Convulsions and Fits..... 1,457
Croup..... 93	Convulsions and Fits..... 83	Convulsions and Fits..... 89	Croup..... 1,396
Scarlatina..... 86	Scarlatina..... 62	Scarlatina..... 80	Hydrocephalus.... 1,054

It will be seen by the above Table, that consumption still retains its bad preëminence as a cause of death in Rhode Island, and with an increased number of victims. There were 15 more deaths from consumption in 1878 than in 1877, and 21 more than in 1876. Previous to 1875 the number had never reached 600. With the exception of consumption, no disease or cause of death has invariably held the same place in the order of greatest number, in a series of years.

The various degrees of change of place will be observed in the columns presented above.

For the first time in these Reports, diphtheria took second place, in 1877. It holds the same position, in 1878, but with a lessened number. Pneumonia, which ranks next to consumption in the long period, takes third position in 1878. Old age follows, in 1878, as in the long period. Cholera infantum occupies a lower rank than in 1877, with a reduction of mortality of about 33. per cent. Scarlatina, which ranks fifth in the long series of years, has dropped in each of the three last years to the lowest place.

Fevers, of various forms, diseases of the heart, apoplexy and croup, have changed their respective positions from year to year, but not to any large degree.

The next Table shows the whole number, sex, parentage and ages of the decedents, and the locality and season of deaths in Rhode Island, in 1878, from sixteen of the principal causes of death.

TABLE XLV.

Showing the Deaths in Rhode Island, in 1878, from Sixteen Principal Causes.

	Accidents.	Apoplexy and Paralysis.	Diseases of Brain.	Cancer.	Cholera Infantum.	Consumption.	Group.	Diarrhoea.	Diphtheria.	Dysentery.	Fevers, Typhoid, &c.	Diseases of Heart.	Whooping Cough.	Old Age.	Pneumonia and Congestion of Lungs.	Scarlatina.
Whole Number.....	122	188	139	119	168	676	93	53	435	40	150	166	54	222	317	86
{ Males.....	89	104	75	38	96	296	45	28	224	14	68	88	26	84	143	41
{ Females.....	33	84	64	81	72	380	48	25	211	26	82	78	28	138	174	45
{ American.....	50	145	73	79	73	296	43	26	201	25	77	109	30	172	176	35
{ Foreign.....	72	43	66	40	95	380	50	27	234	15	73	57	24	50	141	51
January.....	17	19	10	10	1	60	13	2	64	1	7	12	4	14	48	6
February.....	9	14	14	6	..	42	12	4	30	1	1	13	5	20	46	3
March.....	4	25	10	13	2	65	4	1	50	1	8	15	3	22	41	3
April.....	8	13	13	6	..	50	9	1	40	2	5	13	3	26	36	3
May.....	8	13	17	6	..	74	..	1	27	2	6	12	1	19	20	5
June.....	14	15	15	10	6	62	3	1	34	..	10	17	1	11	11	6
July.....	14	10	16	10	69	43	3	13	13	7	9	10	8	11	11	14
August.....	7	15	3	12	49	65	3	14	25	9	18	11	12	17	10	6
September.....	14	11	8	15	25	58	1	3	23	4	27	13	7	22	13	4
October.....	7	13	11	9	10	42	11	3	47	6	20	7	4	17	15	16
November.....	7	17	8	9	4	53	14	4	48	1	21	21	3	21	26	6
December.....	13	18	14	13	2	62	20	6	34	1	18	22	3	22	40	14

TABLE XLV.—Continued.
Showing the Deaths in Rhode Island, in 1878, from Sixteen Principal Causes.

	Accidents.	Apoplexy and Paralysis.	Brain Disease of.	Cancer.	Cholera Infantum.	Consumption.	Croup.	Diarrhea.	Diphtheria.	Dysentery.	Fever, Typhoid, &c.	Heart Disease of.	Whooping Cough.	Old Age.	Pneumonia and Congestion of Lungs.	Scarlatina.
Under 5 years	32	...	60	2	168	19	72	31	267	18	5	4	52	...	115	54
5 and under 10	9	...	9	...	...	8	19	...	124	1	12	2	2	...	9	26
10 "	7	...	5	...	...	14	2	...	33	...	16	3	...	...	4	4
15 "	4	4	6	...	...	69	...	...	3	...	27	7	...	...	10	1
20 "	13	2	3	1	...	214	...	2	1	1	47	8	...	...	14	1
30 "	14	7	10	8	...	139	...	3	2	...	13	18	...	...	17	...
40 "	14	14	11	15	...	78	...	3	3	2	11	16	...	...	28	...
50 "	7	41	12	31	...	56	...	3	1	4	12	26	...	...	20	...
60 "	10	40	13	24	...	45	...	3	...	9	2	36	...	4	42	...
70 "	9	53	5	14	...	29	...	6	1	9	3	35	...	73	45	...
80 and over	4	26	4	5	...	5	...	2	...	1	2	11	...	145	13	...
Not stated	1	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...
Bristol County	4	12	1	5	7	23	14	3	21	2	13	5	...	15	30	3
Kent County	6	16	12	11	14	41	3	3	29	5	15	11	1	8	11	5
Newport Co., Towns	3	10	2	2	1	10	...	...	3	...	5	6	...	9	3	3
Newport City	6	11	9	6	6	21	7	2	20	...	2	9	...	23	15	...
Prov. Co., Towns	46	58	45	37	64	229	25	17	106	17	62	38	9	76	110	14
Providence City	52	66	68	48	71	305	39	28	245	11	56	83	43	61	140	57
Washington Co.	5	15	2	10	5	47	5	...	11	5	14	14	1	30	28	4

Ages.

LOCALITY.

REMARKS.

In the consideration of the causes of death, in 1878, in the following pages, they will be taken up in the alphabetical order in which they appear in the preceding Table.

Other causes of death, however, and from diseases especially, may be commented upon, in connection therewith, or separately, as they may appear to be similar in some respects, or present a high degree of fatality.

ACCIDENTAL DEATHS.

The number of deaths from accidental causes, of all kinds, reported in Rhode Island, in 1878, was 122. This number is 10 less than in 1877, and 6 more than in 1876.

Of these 122 deaths, 11 were from burns and scalds; 44 by drowning; 13 from falls; 6 from poisoning; 7 from railroad accidents, and 41 from various accidents too numerous to specify.

APOPLEXY AND PARALYSIS.

There were 188 deaths from apoplexy and paralysis, reported in Rhode Island, in 1878, which were 7 more than in 1877, and 23 more than in 1876.

The following Table will give a synopsis of the several relations of these causes, for the last fourteen years:

TABLE XLVI.

Showing the whole number and percentage of the Deaths in the State, from Apoplexy and Paralysis combined; and also the sex and parentage of the Decedents from these causes, and the number of the same in each of the Counties from 1865 to 1878, inclusive:

YEARS.	Whole number of Deaths.	APOPLEXY AND PARALYSIS.											
		Number from Apoplexy and Paralysis.		SEX.		PARENTAGE.		DIVISIONS OF THE STATE.					
Per cent.	Males.	Females.	American.	Foreign.	Bristol County.	Kent County.	Newport County.	Providence County, Towns.	Providence City.	Washington County.			
1865.....	3,405	100	2.93	52	48	81	19	9	8	14	23	38	8
1866.....	2,970	92	3.09	46	46	80	12	8	5	17	24	29	9
1867.....	2,889	124	4.29	59	65	101	23	9	9	18	35	49	9
1868.....	2,912	111	3.81	56	55	86	25	9	6	19	27	46	4
1869.....	3,382	117	3.46	55	62	92	25	12	13	18	30	48	6
1870.....	3,238	180	4.32	68	62	105	25	14	10	10	39	52	5
1871.....	3,344	156	4.66	73	83	113	43	10	17	15	40	61	13
1872....	4,247	125	2.97	62	63	96	29	17	9	10	27	52	10
1873.....	4,408	134	3.04	59	75	109	25	9	8	17	26	57	17
1874.....	4,229	156	3.69	84	72	120	36	14	10	16	42	59	15
1875.....	4,317	166	3.61	79	87	133	33	7	13	17	46	75	8
1876.....	4,116	165	4.01	79	86	130	35	13	11	13	45	68	15
1877.....	4,450	181	4.07	87	94	123	58	10	10	16	52	74	19
1878.....	4,441	188	4.23	104	84	145	43	12	16	21	56	66	15
Total.....	52,343	1,945	3.60	945	982	1,514	431	153	145	216	504	774	153

It will, perhaps, be noticed, that in calculating the percentages of the different causes of death, as found in the several Tables under the heading "Causes of Death," the computations are made on the basis of the whole number of deaths, and not on the number of *named causes* of death. Attention may be called to the fact, however, which will explain what otherwise might be thought to be discrepancies between the percentages of the text, and the percentages of the Tables. The

percentages of the text, calculated for the several divisions of the State, are based, when not otherwise stated, on the proportion to the whole number of specified causes.

The method of computation upon the basis of the whole number of deaths, was begun many years ago, with the beginning of the present forms of tabulation, and a change now would destroy the uniformity of results.

The number of deaths from apoplexy and paralysis, was larger, in 1878, than in any preceding year, and the proportion to the whole number of deaths, 4.23 per cent., has been exceeded in only three of the preceding thirteen years.

The various changes from year to year, in the numbers of the sexes, the parentages, and in the different divisions of the State, as shown in Table XLVI, are of considerable interest. The footing up of each column of sex shows a slightly larger number of females, and a glance at the columns of parentage, will show the great difference between the two classes. While the deaths in both classes, from these causes, have increased in a much greater ratio than the increase of population, the decedents of American parentage have been in much the larger proportion, in comparison with the whole American population. Of the whole number of decedents, 1,945, in the last fourteen years, 1,514 were of American parentage, and 431 of foreign parentage, or 77.8 American, and 22.2 foreign parentage.

The mortality from apoplexy and paralysis, in 1878, in relation to season, was as follows:

First Quarter, 53 Second Quarter, 46 Third Quarter, 36 Fourth Quarter, 48

Percentages:

First Quarter, 30.85 Second Quarter, 24.47 Third Quarter, 19.15 Fourth Quarter, 25.43

TABLE XLVII.

Showing the ages of Decedents from Apoplexy and Paralysis in each of the last fourteen years :

APOPLEXY AND PARALYSIS.	PERIODS OF LIFE.								
	Under 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	80 and over.	Not stated.
1865.....		3	5	6	19	30	28	19	....
1866.....	1	1	7	16	9	24	27	7	....
1867.....	2	...	6	6	15	38	40	17	....
1868.....	2	3	8	11	16	27	31	16	2
1869.....	1	1	5	12	20	28	34	15	1
1870.....	4	1	10	9	12	33	41	20	....
1871.....	3	4	7	14	21	46	45	15	1
1872.....	1	4	5	17	20	26	41	11	....
1873.....	2	3	4	14	22	35	37	16	1
1874.....	1	2	9	9	30	39	40	25	1
1875.....	6	2	8	19	23	40	45	22	1
1876.....	4	4	4	18	25	43	49	23	....
1877.....	1	2	9	12	24	50	61	22	....
1878.....	4	2	7	14	41	40	53	26	1
Total.....	32	32	89	172	297	489	571	254	8

Apoplexy is not a disease to be often expected in the earlier periods of life. Paralysis resulting from other causes sometimes occurs, and is occasionally fatal. Hence as the two diseases are taken together in the above Table, there are some recorded cases under 20 years of age. The largest number in every year, with scarcely an exception, is between the ages of 70 and 80. Above the age of 50 years, the number of decedents from apoplexy and paralysis increases rapidly in the ratio of mortality. More than 80 per cent. of all the deaths from these causes, are of persons above 50 years of age.

BRAIN, DISEASES OF.

In Table XLV, under the head of "Diseases of the Brain," are included all those reported as "Cerebral Meningitis," "Cerebritis," "Congestion," "Inflammation," and "Diseases of the Brain."

The number of decedents from these several causes, grouped under the head of "Diseases of the Brain," in 1878, was 139, which was 16 less than in 1877, and 5 less than in 1876. The proportion to the whole number of deaths from given causes, was 3.30 per cent. Of the 139 decedents, 75 were males, and 64 were females; 73 were of American parentage, and 66 of foreign parentage.

The deaths in the different seasons of the year were as follows:

First Quarter.....	84	Second Quarter.....	45
Third Quarter	27	Fourth Quarter.....	83
Total.....	139		

In relation to the periods of life, 60 of the deaths were of children under 5 years of age, or more than 43.0 per cent. of the whole.

CANCER.

The number of deaths reported as having been caused by cancer, in 1878, was 119. This number is 16 less than in 1877; 13 more than in 1876, and is nearly 2.82 per cent. of the whole of the known causes of death in 1878.

As in the preceding topic the several varieties are grouped under one head.

In Tables VI and VII, pages 30 and 35, they are reported as follows: Cancer, various, 75; of the breast, 11; of stomach, 15; of uterus, 18.

Of the whole number of decedents (119) 38 were males and 81 were females; 79 were of American, and 40 were of foreign, parentage.

The large proportional number of females, nearly 70.0 per cent., though not so large as in 1877, when it was 78.52 per cent., is still indicative of the greater liability of the female sex to this dread disease. Cancer of the breast, in females, and cancer of the uterus, constitute nearly 25.0 per cent. of the whole number.

If season has any influence on mortality from cancer, it is from extremes of heat and cold, acting upon an exhausted organism.

In 1878, the deaths from cancer, in the several seasons of the year, were as follows:

First Quarter.....	29	Second Quarter.....	22
Third Quarter.....	37	Fourth Quarter.....	81
Total.....	119		

It will be seen that about 55.0 per cent. of deaths, occurred in the first and third quarters.

Of the whole number of deaths (119) from cancer, in 1878, 4 only were of persons under 30 years of age, and 27 only of persons under 50 years of age, 92 having attained the age of 50 and over.

In relation to locality, the deaths from cancer seem to be nearly evenly distributed in the several divisions of the State, in proportion to the population, the ratio being somewhat less than one to every two thousand of the inhabitants. In Newport county, in 1878, the ratio, however, was only about one in every twenty-seven hundred of the inhabitants.

CHILD-BIRTH.

Deaths from child-birth and concomitant diseases, have heretofore been considered in the alphabetical list of causes of death, probably not so much from the number of deaths, as from their relation to other circumstances.

The number reported in 1878, was 43; 15 of which were from the immediate effects of child-birth alone; 11 from puerperal convulsions, and 17 from puerperal fever.

Of the whole number, 23 were of American, and 20 of foreign, parentage.

In the different seasons of the year they occurred as follows:

First Quarter, 13.....Second Quarter, 9.....Third Quarter, 11.....Fourth Quarter, 10

Of the decedents, 4 were under 20 years of age, 18 between 20 and 30, 17 between 30 and 40, and the remaining 4 over 40 years of age.

CHOLERA INFANTUM.

The number of deaths reported in 1878, from cholera infantum, was 168, which is 91 less than in 1877, and also less than in any year since 1869. It is 223 less than in 1872, and 150 less than in 1875. The diminution is quite remarkable. The number of deaths from diarrhœa and dysentery, was also much smaller in 1878, than for several previous years.

The percentage of deaths from cholera infantum, in 1878, was 3.97, as against 6.08, in 1877.

Of the 168 decedents, 96 were males and 72 females; 73 were of American, and 95 of foreign, parentage; 122 were under the age of

one year, 34 were between 1 and 2 years of age, and 12 were between 2 and 5.

In regard to season, one death was reported in January, 2 in March, 6 in June, 143, or about 85.0 per cent., in the months of July, August and September, and 16 during the rest of the year.

The distribution of deaths from cholera infantum was very unequal in the different divisions of the State. The number in Bristol county, with a population of 11,019, was 7; in Newport county, with a population of 20,887, it was also 7, so that there were nearly twice as many in proportion to the population, in Bristol county as in Newport county. The proportions have, in almost every year, been largely favorable to Newport county, although in 1876 they were largely in favor of Bristol county. In Newport county, *towns*, deaths from cholera infantum are very infrequent. But one was reported from those towns in each of the years 1877 and 1878, in a population of 7,859, by the Census of 1875. This remarkable exemption cannot be accounted for wholly on the ground of the small number of children under five years of age. Taking a whole county, Washington county shows the smallest percentage, that is, one death from cholera infantum to about each 4,000 of the population. Kent county reports one death to about each 1,850, and Providence county one to each 1,360. Providence city one to each 1,418.

In relation to the whole number of deaths from known causes, in 1878, in the different sections of the State, the proportions in the order of the highest percentage, stand as follows:

	Per cent.		Per cent.
Providence County, Towns.....	4.90	Newport City.....	3.14
Kent County.....	4.42	Bristol County.....	2.70
Providence City.....	3.00	Washington County.....	2.00
Newport County, Towns.....1.35 per cent.			

The following Table shows the whole number of reported deaths from cholera infantum; the sex and parentage of the decedents, in each of the larger divisions of the State, in each of the last fourteen years:

TABLE XLVIII.

YEARS.	CHOLERA INFANTUM.										
	Number of Deaths.	SEX.		PARENTAGE.		DIVISIONS OF THE STATE.					
		Males.	Females.	American.	Foreign.	Bristol County.	Kent County.	Newport County.	Providence County, Towns.	Providence City.	Washington County.
1865.....	145	68	82	61	84	17	7	14	48	50	9
1866.....	110	67	43	50	60	1	7	8	39	47	6
1867.....	117	64	53	62	55	4	3	7	45	49	9
1868.....	154	85	69	66	88	13	4	12	44	70	11
1869.....	151	81	70	79	72	6	15	6	48	65	11
1870.....	218	106	107	95	118	15	15	13	69	98	8
1871.....	173	85	87	82	90	14	12	12	59	62	13
1872.....	391	195	196	167	224	16	16	21	157	151	30
1873.....	285	148	137	165	120	17	14	16	120	99	19
1874.....	265	140	125	115	150	4	12	5	84	134	26
1875.....	318	156	162	155	163	20	16	20	108	136	18
1876.....	250	131	119	105	145	5	12	29	68	194	12
1877.....	259	139	120	96	163	12	13	9	96	122	7
1878.....	168	96	72	73	95	7	14	7	64	71	5
Total, 14 years.....	2,998	1,556	1,442	1,371	1,627	151	160	179	1,049	1,273	186

It will be seen by the above Table, that there have been 2,998 deaths from cholera infantum, reported in Rhode Island, during the last fourteen years, of which 1,556 were males, and 1,442 were females; or 108 males to each 100 females; or 51.90 males and 48.10 females in each 100.

Of the whole number of decedents, 1,371 were of American, and 1,627 of foreign, parentage; or 45.73 per cent. of American, and 54.27 per cent. of foreign; or 118.7 foreign to each 100 of American parentage.

It will be noticed that in Bristol county, and Providence city, there was a falling off from 1877 of nearly 60.0 per cent.

CONSUMPTION.

The number of deaths from consumption, reported in Rhode Island, in 1878, was 676; 15 more than in 1877, and 21 more than in 1876. The number is the largest ever reported in the State, but the proportion to the whole number of deaths from known causes, 15.98 per cent., is smaller than the average of the last 19 years, which is 16.96 per cent.

Of the 676 decedents from consumption, the sex and parentage were as follows: In regard to sex, 296 were males, and 380 were females; the proportion standing 43.80 males, and 56.20 females, in each 100; or 128.71 females to each 100 males.

In regard to parentage, 296 were of American, and 380 of foreign, parentage; the proportions, 43.80 American, and 56.20 foreign, in each 100; or 128.71 foreign to each 100 of American parentage.

In regard to season, the largest number of deaths occurred in the second quarterly division of the year, and the smallest number in the fourth, as will be seen by the following summary:

First Quarter, 187.....Second Quarter, 186.....Third Quarter, 166.....Fourth Quarter, 157

The largest number in any one month, was 74 in May; the next largest, 65, in each of the months March and August. In a series of years, the month of May stands first in the order of greatest mortality from consumption.

The smallest number in any month, in 1878, was 42, in each of the months February and October.

No age is exempt from this great destroyer of life. Childhood has no immunity, old age is not spared. Its greatest ravages, however, are in the period of life between 20 and 40 years of age. Of the 676 decedents in 1878, 214, or about 32.0 per cent., were between the ages of 20 and 30, and 139, or about 21.0 per cent., were between 30 and 40. Thus we find about 53.0 per cent., or more than one-half of all the mortality from consumption, is of persons in these two decennial periods of life.

In order to show more concisely the relation of age to mortality, the following synopsis is presented:

Ages.	No. of Deaths.
Under 10 years of age.....	27
Between 10 and 20 years.....	83
Between 20 and 30 years.....	214
Between 30 and 40 years.....	129
Between 40 and 50 years.....	78
Between 50 and 70 years.....	101
Over 70 years.....	34
Total.....	676

In regard to the distribution of mortality from consumption, in 1878, in the different sections of the State, the same remark may be made as in the case of other diseases, that no reliable data can be obtained from the reports of a single year. In the case of consumption, however, the returns are more uniform than in most other maladies. The largest proportion to known causes of all deaths in same section, was 18.88 per cent., reported from Washington county; the smallest proportion, 11.69 per cent., from Newport county. For the whole State the ratio is 15.98 per cent.

The subject of proportions, in their different relations, will be further considered in comments on the next Table.

The following Table shows the total deaths from all reported *known causes*, with the number and percentage of deaths from consumption, in each of the larger divisions of the State, and in the whole State, in each of the last nineteen years, and in the aggregate for the whole period, from 1860 to 1878, inclusive:

TABLE XLIX.—CONSUMPTION.—*Number and Percentage of Known Causes.*

COUNTIES.	1860.	1861.	1862.	1863.	1864.	1865.	1866.	1867.	1868.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	Total 19 yrs.
BRISTOL COUNTY.																				
Total Deaths.....	146	161	119	109	108	190	162	144	129	165	146	150	184	173	159	162	148	201	187	3,008
Consumption.....	23	25	17	17	20	20	31	18	21	26	26	16	23	16	18	21	19	27	23	407
Percentage.....	15.75	15.53	14.29	15.59	11.90	10.52	19.13	12.50	16.28	15.76	17.81	10.67	12.50	9.24	11.32	12.97	12.88	13.43	12.30	13.42
KENT COUNTY.																				
Total Deaths.....	202	272	235	205	255	238	198	214	168	265	238	281	248	241	252	263	209	251	249	4,484
Consumption.....	41	52	51	46	46	41	41	56	38	50	46	63	33	42	32	43	28	42	41	832
Percentage.....	20.29	19.12	21.70	22.43	18.04	17.22	20.70	26.17	22.62	18.86	19.33	22.42	13.30	17.43	12.69	16.35	13.39	16.73	16.47	18.55
NEWPORT COUNTY.																				
Total Deaths.....	279	344	274	491	372	336	342	302	280	259	271	214	262	366	221	277	280	243	265	5,087
Consumption.....	50	74	41	57	48	51	52	47	43	40	37	23	29	44	26	41	45	33	81	812
Percentage.....	17.92	21.51	14.97	11.60	12.90	15.15	15.18	15.56	14.88	15.44	13.66	10.75	11.06	12.02	11.77	14.80	16.07	13.58	11.69	14.28
PROV. CO., TOWNS.																				
Total Deaths.....	690	688	702	807	870	990	883	902	779	912	904	989	1,331	1,889	1,217	1,230	1,110	1,391	1,308	19,152
Consumption.....	138	148	174	162	146	190	171	210	158	180	172	195	221	197	139	201	211	222	229	3,464
Percentage.....	20.00	21.51	24.78	20.07	16.78	19.19	19.36	23.28	20.29	19.74	17.84	19.72	16.73	14.18	11.42	16.34	19.01	15.96	17.51	18.09

TABLE XLIX.—CONSUMPTION.—Number and Percentage of Known Causes.—Continued.

COUNTIES.	1860.	1861.	1862.	1863.	1864.	1865.	1866.	1867.	1868.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	Total 19 yrs.
PROVIDENCE CITY.																				
Total Deaths.....	958	1,013	884	1,188	1,253	1,189	1,013	945	1,086	1,240	1,249	1,239	1,581	1,725	1,965	1,894	1,850	1,932	1,973	26,177
Consumption.....	217	184	191	208	197	191	200	189	214	210	238	195	242	230	270	297	284	294	805	4,356
Percentage.....	22.65	18.16	21.60	17.50	15.72	16.06	19.74	20.00	19.71	16.95	19.06	15.74	15.31	13.33	13.74	15.68	15.35	15.22	15.46	16.64
WASHINGTON COUNTY.																				
Total Deaths.....	228	247	189	190	233	255	201	187	173	241	233	222	265	292	263	284	306	240	249	4,493
Consumption.....	34	40	36	20	41	54	28	39	38	43	56	35	49	51	44	47	68	43	47	813
Percentage.....	15.24	16.20	19.05	10.52	17.51	21.16	13.93	20.86	21.96	17.84	24.04	15.76	18.49	17.47	16.73	16.55	22.22	17.91	18.88	18.09
WHOLE STATE.																				
Total Deaths.....	2,498	2,725	2,403	2,990	3,151	3,198	2,799	2,694	2,624	3,082	3,101	3,095	3,871	4,186	4,077	4,110	3,908	4,258	4,231	62,996
Consumption.....	503	523	510	510	498	547	523	559	512	549	575	527	597	580	529	650	665	661	676	10,684
Percentage.....	20.14	19.19	21.22	17.05	15.81	16.95	18.68	20.74	19.51	17.81	18.52	17.03	15.41	13.86	12.96	15.79	16.78	15.52	15.98	16.96

An examination of Table XLIX, will well repay the time and attention of the reader, by the interesting facts which it discloses.

It presents the only method of studying with advantage and conclusiveness, the characteristics of consumption in relation to locality, and to proportion to all known causes of death in each of the several counties, and in the whole State, in each year, and in the average of a long series of years.

It is only by the averages of a long series of years, that reliable data and definite conclusions can be established.

By the above Table, comparisons can be made in a variety of ways, which will be suggested to the reader.

In Bristol county, we see that the percentages have varied from 9.24 in 1873, to 17.81 in 1870, the percentage of 1878 being 12.30, and the mean average of nineteen years, 13.42, showing the largest exemption from this disease of any section of the State.

In Kent county, the extremes of variation were 12.69 per cent. in 1874, and 26.17 per cent. in 1867. The last is the largest percentage on record in any part of the State, and is quite remarkable. The percentage of 1878 is 16.47, and for the long period the average is 18.55.

Newport county, like Bristol, shows a noticeable comparative freedom from consumption, in proportion to whole number of deaths from all known causes.

The extremes are 10.75 per cent. in 1871, and 21.51 in 1861. It will be seen, also, that the percentages from year to year, have been slightly less uniform than in Bristol county. In 1878, the percentage was 11.69, and the mean average for the long period 14.28.

Providence county, towns, show a variation from 11.42 per cent. in 1874, to 24.78 in 1862. The percentage of 1878, was 17.51, and for the long period 18.09.

Providence city shows a smaller percentage than the county towns. The extremes were 13.33 per cent. in 1873, and 22.65 per cent. in 1860. In 1878, 15.46, and the long period average 16.64 per cent.

In Washington county, the variations were from 10.52 per cent. in 1863, to 24.04 in 1870. In 1878, 18.88 per cent., and average of the long series of years 18.09.

It will be noticed that Providence county towns, and Washington county, have the same mean average for nineteen years.

In the whole State, the difference of percentage in the different years, was from 12.96 in 1874, to 21.22 in 1862. For 1878, the percentage was 15.98, and for the long period 16.96.

It will be understood that the increased or lessened percentages, in the different years, as presented in Table LIII, do not show the actual difference in the number of deaths from consumption, but the proportion to the *total deaths* from all *known* causes. For instance, there were 510 deaths from consumption in the whole State, in each of the years 1862 and 1863, but the percentages were 21.22 and 17.05, respectively. The smaller percentage of 1863 was owing to the occurrence of nearly 600 more deaths in 1863, from all diseases, than occurred in 1862. While the real number of deaths from consumption does not vary greatly one year with another, the occurrence in any year of a sweeping epidemic, or any disease in unusual numbers, attended with large fatality, would greatly reduce the percentage of mortality from consumption for that year. But taking the average percentage of a long period of years, equalizes the irregularities of single years, and affords a basis for definite conclusions.

It may be of interest to compare the whole number of deaths from consumption, in the last nineteen years, in the different divisions of the State, with the number of inhabitants of the same divisions, for the purpose of ascertaining the percentage of deaths from that cause in proportion to the population. If the population of all sections increased with equal ratio, such comparison would show the relative liability of the inhabitants of each section to the disease, with quite full accuracy. But as it is, an average of the semi-decennial enumerations may be taken, which will afford such an approximation to exactness, as to make the comparisons sufficiently correct.

It will be remembered, however, that the annexation of outlying territory to the city of Providence, during the period taken, will make a slight difference between the computed and the real percentages of Providence county and the city, and *only* a slight difference.

For the purpose indicated, the following summary has been prepared with considerable labor. The computations for 1878, are on the basis of the population by the Census of 1875.

CONSUMPTION—PROPORTION OF DEATHS TO POPULATION.

1878.

	Total Deaths.	To population one in every	
Bristol County.....	23.....	482.....	or 2.08 in each 1,000
Kent County.....	41.....	496.....	or 2.02 in each 1,000
Newport County.....	31.....	706.....	or 1.41 in each 1,000
Providence County, Towns.....	229.....	370.....	or 2.72 in each 1,000
Providence City.....	305.....	330.....	or 3.03 in each 1,000
Washington County.....	47.....	427.....	or 2.34 in each 1,000

1860-1878.

NINETEEN YEARS, INCLUSIVE.

	Yearly average to population one in every	Yearly Average. No. of deaths.	
Bristol County.....	442.....	21.4.....	or 2.26 in each 1,000
Kent County.....	403.....	43.8.....	or 2.48 in each 1,000
Newport County.....	492.....	42.7.....	or 2.03 in each 1,000
Providence County, Towns.....	408.....	182.3.....	or 2.48 in each 1,000
Providence City.....	349.....	229.0.....	or 2.87 in each 1,000
Washington County.....	452.....	42.0.....	or 2.21 in each 1,000

The variations between single years, and the average of a series of years, are very clearly shown in the above Tables. It will be seen that in all the divisions, except Providence city, Providence county towns, and Washington county, the percentages of 1878 were smaller than the averages of the long period. But the number of deaths in each, was but slightly diminished, if at all, and in Providence city there was the largest number ever recorded. The proportion of deaths from consumption to the whole population in the city, was, however, much smaller in 1878, than in some other previous years. In 1863, there was one death from that cause in every 244 of the population of the city, or 4.09 in each 1,000; and in 1870, the proportion was one in every 289.5, or 3.45 in each 1,000.

It will be noticed that the liability to consumption in the several divisions of the State, has prevailed in the order of largest percentage as follows, viz.: Providence city; Providence county towns, and Kent county, alike; Bristol county; Washington county, and lastly, and in liability much the least, Newport county.

CROUP AND DIPHThERIA.

These two diseases, similar in many respects, have been considered together in these reports since 1858. The contrast is made for the purpose of showing their various relations, the same as with other diseases, and not from any suspicion of identity, croup being primarily, by general belief, a local disease, and diphtheria a constitutional disease.

The following Table shows the number of deaths and the sex of the decedents in Rhode Island, from croup and from diphtheria, in each of the seven years, from 1858 to 1864, inclusive:

TABLE L.

YEARS.	CROUP.			DIPHTHERIA.		
	Males.	Females.	Total.	Males.	Females.	Total.
1858.....	35	34	69	1	5	6
1859.....	37	21	58	10	10	20
1860.....	27	30	57	24	43	67
1861.....	32	26	58	66	74	140
1862.....	34	39	73	31	50	81
1863.....	51	46	97	73	82	155
1864.....	48	57	105	67	93	160
Seven Years.....	264	253	517	272	357	629

There were no returns of death from diphtheria previous to the year 1858. In that year there were six deaths reported from that cause. From that time the disease rapidly rose to a prominent place in the list of causes of death. It will be noticed that the above Table gives only the *number* and *sex* of decedents from diphtheria and croup, for seven years previous to 1865.

The following Table gives the number, the sex and the *parentage*, of the decedents from croup and from diphtheria, in Rhode Island, in each of the last fourteen years, from 1865 to 1878, inclusive:

TABLE LL.

YEARS.	CROUP.					DIPHTHERIA.				
	Number of Deaths.	SEX.		PARENTAGE.		Number of Deaths.	SEX.		PARENTAGE.	
		Males.	Females.	American.	Foreign.		Males.	Females.	American.	Foreign.
1865.....	94	44	50	32	62	82	41	41	62	20
1866.....	53	26	27	22	31	64	26	38	36	28
1867.....	50	25	25	21	29	31	14	17	19	12
1868.....	30	13	17	14	16	20	8	12	11	9
1869.....	41	19	22	14	27	33	18	15	19	14
1870.....	53	29	24	25	28	33	17	16	18	15
1871.....	72	39	33	31	41	57	23	34	29	28
1872.....	66	37	29	17	49	48	24	24	35	13
1873.....	68	30	38	35	33	45	24	21	35	10
1874.....	65	39	26	28	27	59	30	29	37	22
1875.....	96	53	43	43	53	33	17	16	18	15
1876.....	102	50	52	42	60	159	77	82	69	90
1877.....	95	48	47	34	61	492	239	253	233	259
1878.....	93	45	48	43	50	435	224	211	201	234
Totals, 14 years.....	978	497	481	411	567	1,591	782	809	822	769

During the eighteen years previous to the beginning of the year 1876, there had been reported in Rhode Island 1,205 deaths from croup, and 1,134 deaths from diphtheria. Croup had constantly, in every year, a larger mortality than diphtheria. By the above Table, we can see how marked the change during the subsequent three years. While the mortality from croup was increased nearly 0.50 per cent. annually above the average of the preceding eighteen years, that of diphtheria was increased by an average of about 575.0 per cent. annually, or within 48 of as many deaths in three years, as in the previous eighteen years, and bounding in the second year, to the second place in the list of causes of death, in the order of the greatest number. At the end of the year 1878, the whole number of deaths from croup, for the previous twenty-one years, was 1,495, and of diphtheria 2,220, a difference of 725 in the greater mortality from diphtheria.

SEX AND PARENTAGE.

It will be noticed that the difference in the number of the sex of the decedents from croup has been less in each of the last three years, than in the largest number of previous years, and that in diphtheria the inequality of the sexes has been less during the last fourteen years than during the earlier period of its existence in the State.

For the whole period of twenty-one years, the percentage of mortality from croup, in the sexes was, in each 100, 50.90 males, and 49.10 females.

In diphtheria the percentage of mortality for the same period, in the different sexes, was 47.48 males, and 52.52 females, in each 100 decedents.

The following summary will show in a more concise form the percentage of deaths in the sexes from croup and diphtheria, and also the parentage of the same decedents in the last fourteen years.

IN EACH 100 DECEDENTS.

1865-1878.

	Males.	Females.	Total.	American Parentage.	Foreign Parentage.	Total.
Croup.....	50.82	49.18	100.00	42.02	57.98	100.00
Diphtheria.....	49.15	50.85	100.00	51.66	48.34	100.00

In regard to the parentage of the decedents, it will be seen, that although the foreign population in the State is considerably less than the American, the decedents from croup are in large excess of foreign parentage, and the decedents from diphtheria are in excess of American parentage.

When we consider the numerical relations of the two classes of population, it will however be found, that there is a slight excess of *percentage* of mortality from diphtheria of foreign parentage.

SEASON AND MORTALITY.

The influence of season in regard to mortality from croup and diphtheria, may be seen in the following Table, where they may also be compared with scarlatina, to which they bear resemblance in some respects. The Table will give the whole number of deaths in the periods named, and the average monthly and quarterly percentages of deaths, from each disease:

TABLE LII.

MONTHS.	CROUP. 1853-1878.		DIPHTHERIA. 1858-1878.		SCARLATINA. 1853-1878.	
	Number of Deaths.	Per cent.	Number of Deaths.	Per cent.	Number of Deaths.	Per cent.
January.....	213	12.21	201	9.05	401	11.65
February.....	186	10.66	143	6.45	383	11.13
March.....	145	8.31	163	7.34	355	10.31
First Quarter.....	544	31.18	507	22.84	1,139	33.09
April.....	123	7.05	168	7.56	292	8.48
May.....	89	5.11	140	6.31	317	9.21
June.....	83	4.75	134	6.04	310	9.01
Second Quarter.....	295	16.91	443	19.91	919	26.70
July.....	57	3.26	106	4.77	208	6.02
August.....	53	3.04	129	5.81	159	4.64
September.....	112	6.42	195	8.79	156	4.53
Third Quarter.....	222	12.72	430	19.37	523	15.19
October.....	186	10.66	284	12.79	211	6.13
November.....	232	13.29	291	13.11	272	7.91
December.....	266	15.24	266	11.98	378	10.98
Fourth Quarter.....	684	39.19	841	37.88	861	25.02
Totals.....	1,745	100.00	2,220	100.00	3,442	100.00

It will be observed that the above statistics of croup and scarlet fever are for the whole period of twenty-six years, from 1853 to 1878, inclusive, while those of diphtheria are only for the period of twenty-one years, from 1858 to 1878, inclusive, the year 1858 being the first in which deaths from diphtheria were reported.

It will be interesting to study the above Table, in relation to the season of greatest mortality, in each of the diseases placed in comparison.

For instance, in the case of croup, we see that the average percentage of a period of twenty-six years, regularly diminishes from the beginning of the year, until August, in which month we find the minimum percentage, and then as regularly increases through the remainder of the year, the highest percentage being found in December.

In scarlatina, the percentages diminish in an almost equally uniform manner until September, in which the lowest percentage is found, and the only break in the regularity of diminution during the nine months, occurring in April. The percentages, then, with entire regularity, increase each month until January, in which is found the maximum.

In diphtheria, for the period of twenty-one years, the percentages diminish, though somewhat irregularly, from and including December, through the first half of the year, and reaching the minimum in July; then increasing quite regularly until November, in which month is found the highest percentage.

It will be noticed that diphtheria anticipates both croup and scarlatina, in the time of reaching the lowest percentage, by one month in the case of croup, and by two months in the case of scarlatina.

But aside from the similarity of the three diseases, in the diminution of mortality and of prevalence also, as the months of the warmer season advance, there are decided differences in the relative percentages of the several quarterly divisions of the year.

The following summary will present very concisely the differences in the percentages of mortality, from the different diseases, in each of the quarterly periods, as above computed, and by other modes of comparison. It will be kept in mind that the percentages of diphtheria are for a period of five years less than either of the others, but it is hardly probable that a more extended period would materially change the results, as to its own percentage of mortality in the different seasons:

Percentages.	First Quarter.	Second Quarter.	Third Quarter.	Fourth Quarter.	First 4 mos.	Second 4 mos.	Third 4 mos.	First 6 mos.	Second 6 mos.
Croup.....	31.18.....	16.91.....	12.72.....	39.19.....	38.22.....	16.16.....	45.62.....	48.08.....	51.92.....
Diphtheria.....	22.84.....	19.91.....	19.37.....	37.88.....	30.40.....	22.94.....	46.66.....	42.75.....	57.25.....
Scarlatina.....	33.09.....	26.70.....	15.19.....	25.02.....	41.28.....	29.17.....	29.55.....	59.79.....	40.21.....

These contrasts show very decidedly the variations of the three diseases, in the ratio of mortality, in the different seasons of the year. It will be noticed that in croup and diphtheria, the largest mortality

is in the last third and last half of the year, and in scarlatina the reverse is the rule, the greater number of deaths occurring in the first third and first half of the year, or more than 0.41 per cent. in the first third, and nearly 0.60 per cent. in the first half of the year.

Diphtheria prevailed much more largely than ever before known, as an epidemic, in Providence city, and in some of the towns in Providence county and Kent county, in the years 1877 and 1878. It was also more or less prevalent, during the same time, in all parts of the State.

It may be of interest to contrast the number and percentage of mortality, from diphtheria, in the different divisions of the State, for the years 1877 and 1878.

DIPHTHERIA.

1877-1878.

	Deaths from <i>known causes.</i>		Deaths from Diphtheria.		Per cent.	
	1877.	1878.	1877.	1878.	1877.	1878.
Bristol County.....	201	187	12	21	5.97	11.28
Kent County.....	251	249	44	29	17.53	11.64
Towns, Newport County.....	75	74	—	8	—	4.05
Newport City.....	168	191	2	20	1.19	10.47
Towns, Providence County..	1,391	1,308	122	106	8.77	8.11
Providence City.....	1,932	1,978	295	245	15.27	12.42
Washington County.....	240	249	17	11	7.08	4.42
Whole State.....	4,258	4,231	492	435	11.56	10.28

It will be seen that in Newport city and county towns, and in Bristol county, diphtheria prevailed more largely, or at least the mortality was greater, in 1878, than in 1877. In all the other divisions the mortality was less. In the whole State, the mortality was about one and one-quarter per cent. less in 1878 than in 1877.

The following Table will show the statistics of scarlatina for each of the last twenty-four years, from 1855 to 1878, inclusive, the whole number of deaths in the State, the number, and percentage and sex of the decedents from scarlatina, and the number from scarlatina in each division of the State. It also shows, from 1865 to 1878, inclusive, the parentage of the decedents from scarlatina:

TABLE LIII.

YEARS.	Whole Number of Deaths.	SCARLATINA.											
		Scarlatina.	Per cent.	SEX.		PARENTAGE.		DIVISIONS OF THE STATE.					
				Males.	Females.	American.	Foreign.	Bristol County.	Kent County.	Newport County.	Providence County, Towns.	Providence City.	Washington County.
1855.....	1,846	71	3.8	41	30			23		1	6	42	
1856.....	2,042	208	10.2	109	99			3	1	3	57	144	
1857.....	2,325	147	6.3	69	78				20	47	47	32	1
1858.....	2,616	234	8.9	118	116			5	11	75	61	72	10
1859.....	2,270	71	3.1	34	37			5	2	4	14	45	1
1860.....	2,686	64	2.4	31	33			4	3	7	17	17	16
1861.....	2,927	57	1.9	24	33			2	2	7	9	28	9
1862.....	2,591	47	1.8	25	22			3	4	3	19	14	4
1863.....	3,207	91	2.8	40	51			1		23	24	33	10
1864.....	3,360	266	8.0	120	146			1	19	19	80	141	6
1865.....	3,405	255	7.5	130	125	134	121	33	17	3	86	108	8
1866.....	2,970	28	0.9	15	13	12	16	5		8	12	3	
1867.....	2,869	14	0.5	6	8	10	4	1		1	2	10	
1868.....	2,912	93	3.2	47	46	32	61	2	3	3	34	50	1
1869.....	3,382	286	8.4	126	160	128	158	17	23	12	72	188	24
1870.....	3,238	75	2.3	37	38	28	47	1	6	3	22	35	8
1871.....	3,344	66	1.9	41	25	31	35	1	3	1	37	21	13
1872.....	4,247	53	1.2	22	31	22	31		1	4	27	19	2
1873.....	4,408	287	6.5	124	163	163	124	4	2	42	80	182	27
1874.....	4,229	462	10.9	231	231	176	286	27	17	1	133	268	16
1875.....	4,817	185	4.3	85	100	121	64	8	30	3	35	94	15
1876.....	4,116	80	1.9	34	46	42	38	3	2	7	21	35	12
1877.....	4,450	62	1.4	26	36	29	33	14	4	3	21	12	8
1878.....	4,441	86	1.9	41	45	35	51	3	5	3	14	57	4
Totals, 24 years...	78,213	3,288	4.2	1,576	1,712	963	1,069	165	175	268	220	1,550	196

DISEASES OF THE HEART.

The number of deaths reported in Rhode Island, in 1878, from diseases of the heart, was 166. This is the same number reported in 1876, and 16 less than in 1877. The percentage of diseases of the heart in relation to the whole number of deaths is 3.73, and to the whole number of given causes 3.92.

The following Table shows, for each of the fourteen years, 1865 to 1878, inclusive, the whole number of deaths in the State, the number and percentage from diseases of the heart, the sex and parentage of the decedents from diseases of the heart, and the number in each division of the State:

TABLE LIV.

YEARS.	Whole number of Deaths.	DISEASES OF THE HEART.											
		Diseases of the Heart.	Per cent.	SEX.		PARENTAGE.		DIVISIONS OF THE STATE.					
				Males.	Females.	American.	Foreign.	Bristol County.	Kent County.	Newport County.	Providence County, Towns.	Providence City.	Washington County.
1865.....	3,405	96	2.88	51	47	65	33	6	5	8	27	47	5
1866.....	2,970	115	3.87	58	57	90	25	7	8	10	41	40	9
1867.....	2,889	114	3.94	67	47	81	33	4	9	7	37	49	8
1868.....	2,912	116	3.96	58	58	79	37	5	8	12	35	52	4
1869.....	3,322	128	3.78	75	53	79	49	2	13	11	36	62	4
1870.....	3,238	117	3.61	77	40	77	40	4	10	8	35	59	1
1871.....	3,344	144	4.30	78	66	91	53	4	7	8	42	77	6
1872.....	4,247	189	4.45	104	85	119	70	5	9	10	59	93	13
1873.....	4,408	189	4.29	83	106	122	67	4	11	14	48	101	11
1874.....	4,229	214	5.06	109	105	150	64	6	6	28	50	106	18
1875.....	4,317	186	4.31	84	102	113	73	2	13	22	49	88	12
1876.....	4,116	166	4.03	86	80	109	57	9	11	10	38	86	12
1877.....	4,450	182	4.09	94	88	110	72	3	7	9	57	93	13
1878.....	4,441	166	3.73	88	78	109	57	5	11	15	38	83	14
Total.....	52,343	2,124	3.91	1,112	1,012	1,394	730	66	128	162	592	1,086	130

The statistics of diseases of the heart in relation to sex and parentage, present some interesting facts, not anticipated by the average individual. Of the 2,124 decedents from this cause, in the last fourteen years, 1,112 were males, and 1,012 were females; or 52.36 males, and 47.64 females in each 100; or 109.8 males to each 100 females.

The greatest and most unexpected difference in relation to diseases of the heart, is found in parentage. Of the whole number of decedents stated, 1,394 were of American, and 730 were of foreign, parentage; or 65.63 per cent. of American, and 34.37 per cent. of foreign parentage, in each 100 decedents. The proportion of about 191 of American to each 100 of foreign parentage, in the decedents from this cause, is quite worthy of note.

The following Table shows the number of decedents from diseases of the heart, in each divisional period of life, in each of the last fourteen years:

TABLE LV.

YEARS.	Under 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	80 and over.	Not stated.
1865.	14	4	6	7	22	17	19	9	...
1866.	18	8	14	17	10	23	21	4	...
1867.	11	11	10	13	22	16	27	4	...
1868.	15	5	13	11	14	28	25	5	...
1869.	21	4	14	18	20	22	21	7	1
1870.	19	6	11	13	20	21	23	3	1
1871.	9	12	10	19	23	26	23	6	1
1872.	27	12	22	19	31	26	29	13	...
1873.	19	11	28	18	25	35	42	9	2
1874.	20	16	26	21	27	50	40	12	2
1875.	14	16	25	20	32	29	41	9	...
1876.	14	10	15	19	20	38	39	10	1
1877.	15	11	20	18	27	45	33	13	...
1878.	16	8	18	16	26	36	35	11	...
Total, 14 years.	232	134	232	229	319	432	423	115	8

PNEUMONIA AND CONGESTION OF THE LUNGS.

The following Table shows, for each of the last fourteen years, the whole number of deaths reported in Rhode Island, the number and

the percentage, with the sex and the parentage of the decedents from pneumonia and congestion of the lungs, and the number in each year, in each division of the State:

TABLE LVI.

YEARS.	PNEUMONIA AND CONGESTION OF THE LUNGS.												
	Whole Number of Deaths.	Pneumonia, &c.	Per cent.	SEX.		PARENTAGE.		DIVISIONS OF THE STATE.					
				Males.	Females.	American.	Foreign.	Bristol County.	Kent County.	Newport County.	Providence County, Towns.	Providence City.	Washington County.
1865.....	3,405	175	5.1	80	95	110	65	8	11	21	49	74	12
1866.....	2,970	193	6.5	94	99	127	66	18	27	13	59	81	10
1867.....	2,889	172	5.9	68	104	103	69	8	12	12	56	68	16
1868.....	2,912	191	6.6	99	92	120	71	9	5	16	54	92	15
1869.....	3,382	190	5.6	104	86	110	80	7	10	10	63	88	12
1870.....	3,238	182	5.6	102	80	96	86	6	12	15	55	78	16
1871.....	3,344	218	6.5	104	114	129	89	12	21	11	68	85	21
1872.....	4,247	229	5.4	119	110	125	104	11	1	9	74	120	14
1873.....	4,403	284	5.3	127	107	143	91	11	9	10	65	123	16
1874.....	4,229	250	5.9	118	132	143	107	6	13	7	73	136	15
1875.....	4,317	400	9.3	199	201	243	157	14	27	25	105	198	31
1876.....	4,116	339	8.2	164	175	162	177	18	23	16	97	163	27
1877.....	4,450	226	5.1	104	122	127	99	10	7	14	81	98	16
1878.....	4,441	317	7.1	143	174	176	141	10	11	18	110	140	28
Total.....	52,343	3,316	6.3	1,825	1,691	1,914	1,402	138	179	197	1,009	1,544	249

The whole number of deaths from pneumonia and congestion of the lungs, reported in Rhode Island, in 1878, was 317, an increase of 91 above that of 1877, and less by 2 than that of 1876. The average of the last fourteen years, is 237. The number in 1877, *i. e.*, 226, as will be seen, was less than the average for the long period, and that too, as against the increase of population. The percentage of mortality from these causes in 1878, was 7.10, or four-fifths of one per cent. above the average 6.30, of fourteen years.

The preponderance of females, among the decedents from inflammation of the lungs in 1878, is quite unusual. The proportion is

121.7 females to each 100 males, and nearly reaches the average excess of female decedents in consumption. For the period of fourteen years, the average proportion is 104 females to each 100 males; or 51 females and 49 males in each 100 decedents from pneumonia and congestion of the lungs. The liability to attacks of acute diseases of the lungs, seems to be nearly equally divided between the sexes, the difference being in favor of the male sex, which, from the presumed greater exposure to the usual exciting causes, would be expected to suffer the most. It is possible, however, that the better physical stamina of the male sex, may result in a larger proportional number of recoveries.

In regard to parentage, the proportion of the decedents is quite unequal. Of the 3,316, whose deaths were reported during the last fourteen years, 1,914 were of American, and 1,402 were of foreign parentage; or 57.72 of American, and 42.28 of foreign, in each 100 decedents; or 136.52 of American to each 100 of foreign parentage.

The following Table shows, for each of the last fourteen years, the number of decedents in Rhode Island, from pneumonia and congestion of the lungs, in each division of ages:

TABLE LVII.

YEARS.	Under 5.	5 to 10.	10 to 15.	15 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	80 and over.	Not stated.
1865.....	65	4	2	.....	14	11	15	17	21	21	5	.....
1866.....	57	4	4	5	12	10	14	21	25	32	9	.....
1867.....	57	9	2	3	10	11	13	16	25	13	12	1
1868.....	70	4	3	3	15	8	16	13	19	27	13	.....
1869.....	64	11	1	2	11	12	9	24	25	16	11	.....
1870.....	84	6	5	4	6	7	8	14	20	19	8	1
1871.....	71	7	2	7	10	17	16	16	35	17	19	1
1872.....	88	5	1	7	17	20	19	22	24	19	11	1
1873.....	106	4	8	3	10	14	16	17	24	23	10	.....
1874.....	76	9	4	6	17	17	25	21	40	27	8	.....
1875.....	120	9	3	8	22	30	35	39	61	43	28	2
1876.....	116	5	4	3	20	20	32	35	48	39	17	.....
1877.....	79	2	.....	7	15	15	24	27	22	24	9	2
1878.....	115	9	4	10	14	17	28	20	42	45	13	.....
Total.....	1162	88	43	68	193	209	270	306	431	365	173	8

It will be observed, upon examination of Table LVII, that pneumonia and congestion of the lungs are largely most fatal in the very earliest, and in the most advanced periods of life.

Of the 3,316 decedents in the last fourteen years, more than one-third were under five years of age, and of the remainder, nearly one-half were above the age of sixty years, notwithstanding the greatly lessened number of persons liable to disease, at the advanced age of 60 and over. During fifty-five of the most active years of life, the mortality from the acute diseases of the lungs, scarcely exceeds 0.33 per cent. of the whole.

TYPHOID FEVER.

The number of deaths in Rhode Island, in 1878, reported under the general title of "Fevers," was 150. This is 16 more than in 1877, and 24 more than in 1876. The number includes all reported under the following specific terms: "Bilious," 2; "Gastric," 3; "Remittent," 1; "Typhoid or Typhus," 134; "Fever," 10. It is probable that nearly, if not quite all fevers occurring in Rhode Island, are essentially typhoid, the type being modified by a variety of circumstances. Of course the term is not designed to cover all febrile states, dependent on a variety of acute and chronic inflammations.

The following Table shows, for each of the last fourteen years, the whole number of deaths in the State, the number and the percentage, and the sex and the parentage of the decedents from fevers, and the number in each division of the State.

TABLE LVIII.

YEARS.	TYPHOID FEVER.													
	Whole Number of Deaths.													
		Typhoid Fever.	Per cent.	SEX.		PARENTAGE.		DIVISIONS OF THE STATE.						
				Males.	Females.	American.	Foreign.	Bristol County.	Kent County.	Newport County.	Providence County, Towns.	Providence City.	Washington County.	
1865.....	3,405	229	6.4	114	115	149	80	8	17	22	82	79	21	
1866.....	2,970	150	5.0	73	77	82	68	7	5	32	54	45	7	
1867.....	2,880	119	4.1	60	59	84	35	9	10	17	47	31	5	
1868.....	2,912	84	2.9	45	39	57	27	4	5	7	30	23	15	
1869.....	3,382	101	3.0	53	48	79	22	7	7	1	37	33	16	
1870.....	3,238	153	4.7	66	87	80	73	5	11	14	57	49	17	
1871.....	3,344	125	3.7	60	65	69	56	2	8	10	41	51	13	
1872.....	4,247	179	4.2	87	92	91	88	4	12	6	75	65	17	
1873.....	4,403	172	3.9	73	99	113	59	4	9	9	61	56	33	
1874.....	4,229	117	2.8	57	60	56	61	1	10	3	37	58	8	
1875.....	4,317	147	3.4	73	74	90	57	1	4	6	49	60	18	
1876.....	4,116	120	3.0	65	61	71	55	5	9	13	44	33	22	
1877.....	4,450	134	3.0	63	71	65	69	8	10	8	52	44	12	
1878.....	4,441	150	3.4	68	82	77	73	13	15	7	62	58	14	
Total.....	52,343	1,966	3.1	957	1,029	1,163	823	78	132	155	728	694	213	

The proportion of deaths from typhoid fever, to the whole number, in 1878, was 3.4 per cent., which is slightly larger than the average of fourteen years, which is 3.1 per cent. Of the *sex* of the decedents, in 1878, 68 were males, and 82 were females; or 45.3 males, and 54.7 females in each 100; or 79.4 males to each 100 females.

For the period of fourteen years, the average proportion is 48.18 males, and 51.82 females in each 100 decedents; or 88.48 males to each 100 females.

In respect to the *parentage* of decedents, the differences in 1878 are less than in respect to *sex*.

The proportions are 50.13 of American, and 49.87 of foreign, parentage, in each 100 decedents. These proportions are very nearly equal, and differ very largely from the average of fourteen years, which

are 58.55 of American parentage, and 41.45 of foreign parentage, in each 100; or 141.31 of American, to each 100 of foreign, parentage.

The following Table shows the number of decedents from fevers, in each division of ages, in each of the last fourteen years, in the State of Rhode Island:

TABLE LIX.

TYPHOID FEVER.		PERIODS OF LIFE.										
YEARS.		Under 10.	10 to 15.	15 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	80 and over.	Not stated.
1865.....		35	18	46	54	30	14	18	7	5	2	...
1866.....		23	10	21	26	21	16	9	14	10	...	...
1867.....		17	6	23	33	12	11	8	4	2	2	1
1868.....		10	7	10	21	8	8	10	4	5	...	...
1869.....		10	8	14	23	9	7	9	8	6	2	...
1870.....		15	13	28	39	16	20	7	7	6	1	...
1871.....		13	10	20	28	18	16	9	4	5	2	...
1872.....		17	18	34	54	20	9	12	11	3	1	...
1873.....		27	12	34	31	25	13	13	7	8	2	...
1874.....		10	14	26	32	9	5	10	3	6	2	...
1875.....		23	14	19	43	18	10	10	6	4	...	...
1876.....		21	10	15	24	14	9	6	16	6	3	2
1877.....		22	13	13	36	20	8	5	7	2	2	1
1878.....		17	16	27	47	13	11	12	2	3	2	...
Total, 14 years.....		260	169	330	496	233	157	138	100	71	21	4

It was remarked on a previous page, that the mortality from pneumonia and congestion of the lungs, was greatest in the very earliest, and in the most advanced periods of life. It is now seen that typhoid fever is more a disease of the middle periods of life, or that, at least, the mortality is greatest between the ages of 15 and 40; more than one-half of the whole number of deaths from typhoid fever, occurring in that more active part of life.

COMPARATIVE RESULTS.

The following Table shows the percentage of total mortality from several prominent causes, as reported in 1878, in the whole State, and in the several counties of the State; and also the percentages of the same causes in the whole State, in 1876 and 1877:

TABLE LX.

CAUSES OF DEATH.	Whole State, 1878.	Bristol County.	Kent County.	Newport County, Towns.	Newport City.	Providence County, Towns.	Providence City.	Washington County.	Whole State, 1877.	Whole State, 1876.
Accidents (all kinds).....	2.89	2.14	2.41	4.05	3.05	3.52	2.64	2.00	3.10	2.94
Apoplexy and Paralysis.....	4.45	6.42	6.43	13.52	5.76	4.43	3.35	6.03	4.25	4.22
Brain, Diseases of.....	3.23	0.54	4.82	2.70	4.71	3.43	3.45	0.80	3.68	3.75
Cancer.....	2.82	2.67	4.42	2.70	3.14	2.83	2.43	4.02	3.17	2.72
Cholera Infantum.....	3.97	3.74	5.62	1.85	3.14	4.89	3.60	2.01	6.06	6.41
Consumption.....	15.98	12.30	16.47	13.51	10.99	17.51	15.46	18.88	15.52	16.78
Convulsions and Fits.....	2.65	2.67	2.41	4.05	1.57	2.52	2.94	1.61	1.95	2.28
Croup.....	2.20	7.49	1.21	.....	3.67	1.91	1.98	2.01	2.23	2.61
Debility.....	1.91	.....	0.40	.....	1.57	2.91	1.83	1.21	2.65	2.80
Diarrhoea.....	1.25	1.60	1.21	.....	1.05	1.30	1.42	.....	2.11	1.87
Diphtheria.....	10.28	11.23	11.64	4.05	10.47	8.11	12.42	4.42	11.56	4.07
Dysentery.....	.95	1.07	2.01	.....	.....	1.30	0.56	2.01	1.22	1.28
Fevers.....	3.94	6.96	5.22	6.75	1.05	4.74	2.84	5.62	3.55	3.69
Heart, Diseases of.....	3.92	2.67	4.42	8.10	4.71	2.91	4.21	5.62	4.28	4.25
Hooping Cough.....	1.28	.....	0.40	.....	.....	0.68	2.18	0.40	0.75	1.23
Hydrocephalus.....	1.65	3.21	0.80	.....	1.57	1.53	1.98	.....	1.29	1.74
Kidneys, Diseases of.....	1.89	2.14	1.21	1.85	1.05	1.61	2.38	0.80	1.57	1.28
Liver, Diseases of.....	1.06	3.74	0.40	4.05	.52	1.07	0.86	0.80	1.06	1.13
Marasmus.....	1.30	1.60	.....	.....	1.05	0.77	1.98	0.40	0.99	1.13
Pneumonia and Congestion of Lungs.....	7.49	5.35	4.42	4.05	7.85	8.41	7.10	11.24	5.31	8.69
Scarlatina.....	2.03	1.60	2.01	4.05	.....	1.07	2.89	1.61	1.46	2.05

It will be understood that the percentages of the preceding Table are calculated on the basis of the whole number of deaths from *specified causes*, in the whole State, and in the several divisions of the State in which the deaths from the several named causes occurred.

The great variations in the percentages of deaths from the same diseases, in the different sections of the State, in the year 1878, and also the variations of one year from another, in the percentages of mortality from the different causes of death in the whole State, in the last three years, are very clearly shown in the above Table.

It should not be forgotten, however, in an examination of the Table, that the percentages are for named causes of deaths reported, as before remarked, and *not in proportion to population*. For instance, in Newport county towns, where but an exceedingly small proportion of the inhabitants are engaged in mechanical industries at all hazardous to life, the percentage of mortality from accidents of all kinds, in 1878, is 4.05, while in Providence county towns, where the population is very largely engaged in manufacturing and other pursuits, where life is exposed to danger, the percentage of the same causes of death is only 3.52. The reason of the larger per cent. in Newport county towns, is not from the large proportion of accidents to the population, but to the small number of deaths. The number of deaths from accidents was only 3, the whole number of deaths from known causes 74, therefore the percentage 4.05. Now if we reckon the proportion of deaths from accident, *to the population*, we shall find that it is less in Newport county towns, than in Providence county towns; that is, as one in every 2,619, in the first, to one in every 1,831 in the last division.

The same may be said of the mortality from apoplexy and paralysis, the percentage of which is greatly in excess, in Newport county towns, of any other division of the State, solely from the fact of the small proportion of deaths to population, from all other causes.

In regard to the general results, for the whole State, in the comparison of one year with another, there will be found some causes of death showing a considerable disparity of percentages, and some maintaining in all the years, an approximately fixed ratio.

In the first class, we shall find cholera infantum, ranging from 3.97 per cent., in 1878, to 6.41 per cent., in 1876.

Diphtheria, showing a percentage of 10.28, in 1878; 11.56, in 1877, and 4.07 per cent., in 1876.

Hooping cough, pneumonia and scarlet fever, show considerable differences in percentage of mortality in the different years.

In the second class, are found apoplexy and paralysis, consumption, fevers of all kinds, diseases of the heart, diseases of the liver, &c.

The comparative results in the different divisions of the State, in 1878, show very marked disparity. Apoplexy and paralysis, as before alluded to, have a remarkably large percentage in Newport county towns, that is, 13.52; more than three times as large as the average of the whole State, which is 4.45, while Providence city has a percentage of only 3.35.

Of diseases of the brain, Bristol county shows only 0.54 per cent., while Kent county reports a proportion of 4.82 per cent.; more than nine times larger than Bristol county.

Cholera infantum ranges from 1.35 per cent., in Newport county towns, to 5.62 per cent., in Kent county.

The smallest percentage from consumption was in Newport city, 10.99; the largest was in Washington county, 18.88. The average of the whole State was 15.98 per cent.

The percentage from croup varied from 0.00, in Newport county towns, and 1.21 in Kent county, to 7.49 in Bristol county.

Diphtheria was more evenly distributed, in 1878, than in 1877, with a less number of deaths. Newport county towns, returning no deaths from that cause in 1877, show a percentage of 4.05, in 1878; and Newport city, which returned only 1.19 per cent. mortality from diphtheria, in 1877, returns 10.47 per cent., in 1878. Providence city reports the largest percentage, 12.42; about one-fifth less than the previous year.

The percentage of deaths from fevers of all kinds, was very small in Newport city, 1.05; and very large in Newport county towns, 6.75; and Bristol county, 6.96. The average of the State is 3.94 per cent.

Diseases of the heart were also largely fatal in Newport county towns, 8.10 per cent; the State average being 3.92 per cent. .

The percentage of pneumonia and congestion of the lungs, always a large factor in the mortality of the State, was especially such in 1878, with a percentage of 7.49; though less somewhat than in 1876, when it was 8.69 per cent. The percentages in the different divisions varied from 4.05 per cent., in Newport county towns, to 11.24 per cent., in Washington county.

These comparisons are already sufficiently extended to direct the attention of the reader to the almost endless relations, that causes of death bear to each other, in the same and in different years, and different localities; and if sufficient interest is felt, the subject can be pursued to a very great length.

RESULTS OF REGISTRATION.

The preceding statistics, compiled from the Registration Returns of the State, for the year 1878, with observations, comparisons and comments on the same, prepared by the Secretary, will present not only the most comprehensive report of the social and sanitary condition of the State during that year, having relation to the objects for which the State Board of Health was established, but will also afford a very good sanitary history of the births and deaths, in their various relations, for more than a quarter of a century. The value of averages in vital statistics, for long periods of time, has been often alluded to in the preceding pages, and need not be repeated here. In the preceding Tables, may be found a mine of study and speculation in regard to conclusions, which the comparisons of the results of many years registration seem to warrant.

REPORTS FROM LOCAL BOARDS OF HEALTH.

In this State the town councils of the several towns, and the boards of aldermen in the cities of Providence and Newport, are by General Statutes constituted the local boards of health in their respective towns and cities; unless the said town councils and boards of aldermen appoint a special board of health; and the clerks of the town councils and boards of aldermen, are by law clerks of the local boards of health, unless relieved by special municipal ordinance.

Clerks of local boards of health, in whatever locality, must, from their official position, have more or less knowledge of the prevalence of diseases affecting considerable numbers of persons in their several localities, and especially if those diseases are dangerous to life; or result in serious disability at, and during the time of occurrence, or for a more lengthened period of time. They also, especially in the country towns, would most probably be informed of the existence of any generally suspected *source* of disease, within the limits of their own towns, or of any *source* of temporary or prolonged ill health, and also of the presence of any disease among animals affecting large numbers, whether incidental to the locality or epidemic by contagion or infection, and especially if attended with considerable fatality.

It would seem quite reasonable, or rather, it would seem quite essential, that it should be the duty of the clerks of the said local boards of health, to report, in the interests of public health, the occurrence and the continued existence of any of the circumstances above named,

to the Secretary of the State Board of Health, to the end that the Board, if deemed desirable, might investigate the causes of the prevailing diseases, or presumed source of general ill health, with the purpose of the prevention, removal or restriction of the same, as far as possible.

In furtherance of this object, it is the design of the Secretary to ask of the Honorable the General Assembly the enactment of a law by which it shall be made the duty of clerks of local boards of health, to give information to the Secretary of the State Board of Health, upon inquiry, of such facts and circumstances as shall have come to their knowledge.

In this way there may be afforded the Board some valuable opportunities for complying with that section of the act by which it was established, which provides as follows:

"The Board shall take cognizance of the interests of life and health among the citizens of the State; they shall make investigations into the causes of disease, and especially of epidemics and endemics among the people, the sources of mortality, and the effects of localities, employments, conditions and circumstances on the public health, and shall faithfully do all in their power to ascertain the causes and the best means for the prevention of diseases of every kind in the State."

Such a law as proposed, would doubtless commend itself to the good judgment of the legislators, as being just to the public and the State, and also necessary to the best efficiency of the Board of Health. The service required of clerks of the local boards, would ordinarily require not more than five minutes of time, and if extended information was desired, full compensation for such extended service would be offered. It is not designed, however, that such clerks of town councils or local boards of health, shall be *required* to make personal efforts to obtain a knowledge not already in their possession, but to give such information in reply, as the facts and circumstances already known will warrant.

REPORTS OF PREVALENT DISEASES.

The attempt to obtain from the several towns of the State monthly reports of the diseases of importance, prevailing in them during the months reported, with the average degree of severity of the same, and in those attended with fatal results, the estimated percentage of mortality; and also reports of the general amount of sickness of all kinds,

compared with corresponding months of preceding years, has been successful to some extent, but not to so great an extent as has been desired.

The physicians who have been called upon to give uncompensated service to the State, are practitioners whose time is valuable to themselves, and to whom any leisure hours they may have from their arduous professional duties, seem to be needed for such recreation and repose, as a needful preservation of good health would demand. Under such circumstances it has not been surprising that some who promised to do what they could, in advancing the sanitary interests of the State, have found the prompt and regular labor required in the monthly reports, somewhat irksome and distasteful, and so have from lack of energy or inclination, or from forgetfulness, or feeling of needed repose, dropped out of the ranks of regular correspondents and cease to be heard from.

This experience is, however, that of all associations or individuals, who have desired continuous service for lengthened periods of time without compensation, depending for the continuance of the labor, on the interest and enthusiasm of the correspondent in the work engaged.

And this has especially been the experience of boards of health, sanitary associations, and private individuals, engaged in collecting from whatever source they may, such bits of information, narrative of circumstances and accounts of facts, as shall serve their purpose.

The experience of the Secretary has, however, not been at all disheartening, but rather a stimulant and incentive to further effort, and especially as the better class of original correspondents still remain, and comprise also a majority of all, and their circuits of labor include all important portions of the State.

It is a question now whether for the period of time, too much was attempted to be accomplished by the comprehensive series of questions proposed to correspondents for the year 1879. The best methods of ascertaining the diseases incident to localities, and from thence seek their causes, will become more and more apparent, as the attempts to obtain a record and report of the same are prolonged, and the difficulties noted.

Such changes will be made in the questions proposed, and such methods of reply suggested, as from time to time may seem to be best adapted to the circumstances and the occasion.

The following circular to regular correspondents, was issued early in the year:

(CIRCULAR D.)

FROM THE OFFICE OF THE STATE BOARD OF HEALTH.

To the Correspondents of the Board :

1. What diseases of importance have prevailed in your section during the preceding month? Please give names in the order of greatest prevalence, in first column of blank "Return of diseases."
2. Please state in second column of blank return, the average degree of severity, the sign + signifying a severe form, the sign — an average, and the sign — a mild form.
3. What has been the approximate ratio of deaths to whole number of cases of each disease?
4. What has been the average amount of sickness of all kinds in your section, in proportion to the population, during the month reported, compared with the corresponding month of the year 1878? For increase use sign +, for average or same amount sign — and for decrease sign — in column 4.
5. Please state percentage of increase in column 5.
6. Please state percentage of decrease in column 6.
7. What has been the proportion of deaths from all diseases, compared with the same, during the corresponding month of the previous year, taking into account the increase or decrease of population, if any?
8. What disease or diseases, if any, unusual in your section, or at the period of the year reported, prevailed during the month?
9. What was the degree of severity of the same?
10. What was the percentage of mortality of the same?
11. What diseases were notably few in number, or absent, that usually are notably prevalent during the period reported?
12. What diseases among animals, if any, were prevalent during the month?
13. What the degree of severity, of any disease prevailing among animals, if any?
14. What the percentage of deaths from any disease among animals, if any?
15. Has the average of falling water from snow or rainfall been greater or less during the month, than the average for the corresponding months of previous years?
16. Has the average temperature of the atmosphere for the month, been higher or lower than the average of same month?
17. Has the temperature been more steady, or more fluctuating than usual?
18. Has the range of fluctuation been greater or less than usual?
19. Has there been an excess, or unusual diminution of moisture in the atmosphere during the month?
20. Has there been any unusual absence, or excess of moisture in the soil?
21. Please state the number of diseases, believed to be caused primarily by some deleterious agent, condition or circumstance, the number of cases of each set down in numerals, in the column following the name of the cause. For instance, Alcohol in some form, Coffee, Opium, Over-work, physical or mental, Occupation, Scrofula, Tea, Tobacco, etc. (See blank return partly filled.)

22. Please state number of deaths during the month from accident, and cause or kind, as from explosion of gas, kerosene, naphtha, or from whatever cause. Particulars are desirable. Kind of accident given in columns 4, 5 and 6 of RETURN and number of deaths in column 7.

23. Please also give number of cases of evident poisoning from any cause whatever. Name of poison in columns 4 and 5, number of cases in column 6, and number of deaths in column 7.

24. Please report any facts, that have come to your knowledge in regard to the communicability of diseases, the origin of infection, by what means conveyed, how long contagion had probably been dormant, mode of invasion, progress, etc.

25. Please also give your opinion, in regard to the manner in which infection acts to produce disease, or the various modes in which different kinds of infection act to produce each its specific form of disease.

26. Please also give notice of any source of disease known to you, which is removable, and any suggestions that occur to you, as a means of preventing sickness.

Any facts or suggestions coming under any questions in relation to the cause or prevention of disease, will be favorably received, and will go into the next report of the State Board of Health, with such comments and conclusions as the facts seem to warrant, and with the names of the authors unless otherwise ordered.

Physicians receiving this circular, and not having heretofore signified their willingness to act as regular correspondents, will confer a favor on the Board, and also the public at large, by filling up the blank RETURN for the month of January. Those who do so will have their names entered on the list of regular correspondents, and postage stamps will be forwarded them, for payment of postage on RETURN for January, together with stamped envelopes and blank RETURNS for future reports. Any additional postage incurred by sending to the Board extended remarks concerning any topic, immediately or remotely connected with sanitary science, will be refunded at once by the Secretary.

Questions not having blank spaces on the RETURN for reply, may be answered on any unoccupied space, or on a separate sheet of paper, each reply having a numeral prefixed, corresponding to the number of the question replied to.

Please keep this circular in your journal or ledger for future reference.

The object of the preceding questions will be apparent by brief explanations, if it does not appear upon their face. "To make investigations into the causes of disease," the diseases must first be found, and the places in which they occur. To ascertain "the effects of localities, employments, conditions and circumstances on the public health," as the law directs, the diseases or departures from normal health, that occur or have their origin, or development, or advancement in the localities, or under the conditions and circumstances conducive to the same, must first be made known; and to be made known,

for sanitary purposes, there must be a *report* of the *kinds of diseases*, prevailing at different periods of the year, in all the different localities in the State, and the conditions and circumstances under which they occur. For instance, if in a certain village, there occurred among families using water from the same well or different wells, the water in which was derived from the same pond, stream or other source, and members of these different families should have attacks of dysentery, diarrhoea, or some other disease dangerous to life, or dyspepsia or some other obscure but disabling complaints, affecting a considerable number in a similar way, and it should be found that these diseases occurred when the streams and wells were low, and were the severest when the water was lowest, and other persons in the same vicinity not using the same water, were not affected in the same way, it would afford presumable evidence that some impurity in the water, more concentrated by there being less water to dilute it, was the cause of the peculiar kinds of disease. The causes of disease in different localities, are, and will be found to be quite different, but they are doubtless, in a considerable proportion removable, and their presence can only be found as indicated above, by reporting diseases as well as deaths, and as far as possible, the circumstances surrounding the persons sick, and the regularity of occurrence, under the same circumstances.

It will be understood, that the degree of temperature and moisture of the atmosphere, the condition of the soil, the rainfall, not alone as furnishing a dry or humid soil, but as affecting vegetation, the disorganization and putrefaction of vegetable and animal substances, may all have influences indirectly, if not directly, in producing or modifying causes of disease, which may be largely avoided if known. But a multitude of observations must be made, a multitude of events and circumstances having relation to, or resulting in decided and definite disease, must be recorded and compared, to arrive at one definite conclusion, or produce a single fact; and only by a single fact brought to light here, and another there, and others elsewhere, can sanitary science be put on a firm basis, and the laws governing human health be established.

RETURNS OF DISEASES.

The blank "Return of Diseases," furnished regular correspondents, for reporting prevalent diseases and various attendant circumstances, in their several localities, monthly, in reply, in part, to the series of questions already presented, was as follows:

FORM OF BLANK

RETURN OF DISEASES.

RETURN OF DISEASES, &c.

In the *and surrounding territory, for the month of* , 1879.

1. Diseases of importance prevailing during the month, numbered in order of greatest prevalence.	2. Degree of severity.	3. Ratio of mortality.	4. Comparative amount of general sickness.		5. Ratio of increased sickness.	6. Ratio of decreased sickness.		7. Ratio of whole number of deaths to whole number of cases of sickness.	8. Unusual diseases prevalent during the month.	9. Degree of severity.	10. Ratio of mortality.
			Increased.	Decreased.		per cent.	per cent.				
	+ Severe. - Average. - Mild.	per cent.	+ - +		per cent.		per cent.				per cent.
1. Pneumonia or congestion of lungs, 2. Diphtheria, 3. Scarlet Fever, 4. Rheumatism, Acute,	+ + + +	.08 .15 .03 .04	22. Accidents, death from, Kinds.				.02	No.	Dysentery, Diarrhoea,	+	.06 .00
			23. Poisoning, Causes, Wall paper, Lead, Other Poisons.					No. Deaths.			
								2 0			
								1 1			

RETURN OF DISEASES, &c.—Continued.

11. Usual diseases not prevalent during the month.	12. Diseases of animals prevalent.	13. Degree of severity.	14. Ratio of mortality.	Meteorology, and presumable causes of disease.	For increase use sign +, for average —, for decrease —.
			per cent.		
1. Acute Catarrh,	Hog Cholera,	+	.50	15. Snow or rainfall greater or less,	+
2. Influenza,	Pleuro Pneumonia,	—	.50	16. Mean Temperature higher or lower than average,	—
3. Acute Bronchitis,				17. More or less fluctuating,	+
				18. Range of fluctuation greater or less,	+
				19. Humidity of atmosphere greater or less,	—
				20. Humidity of soil greater or less,	—
				21. Presumable cause of disease,	No. of cases.
				Alcohol,	2
				Coffee,	
				Opium,	2
				Overwork, physical,	
				" mental,	
				Occupation,	
				Scrofula,	
				Tea,	
				Tobacco,	
				Vice,	1
				Other causes.	

N. B.—This return is filled in part, to show the mode of filling. See names of diseases in columns 1, 8, 11, 12, and 23. See also signs and decimals in columns 2, 3, &c.

For Locality.—If this return is from a city, fill up with city of If from compact towns, like Pawtucket and Woonsocket, fill up with town of If from village, fill up with village of

It will be observed on examination, that the spaces on the "*Return*" and the numbered headings of the same, correspond with the numbers of the questions on Circular D., to which reference might at any time be made if desired.

There having been some delay in preparing and printing the blank "*Returns of diseases*," the following circular, presenting explanations, and some additional suggestions, was forwarded to correspondents with the Circular D. and the blank "*Returns*."

(CIRCULAR E.)

OFFICE OF SECRETARY OF THE STATE BOARD OF HEALTH.

PROVIDENCE, Feb. 21st, 1879.

DEAR DOCTOR:

Herewith I send a series of questions, and blank for reply in such manner as will give you the least possible trouble in the way of statement. It will be seen that Circular D. refers to the month of January only, but the delay in printing has carried the time so far along, that if you can make reply for January and February on the same sheet please do so, designating the respective months by abbreviations or in such manner as you may suggest.

These replies of course can only be *general* and *approximate*, but coming from all parts of the State, and from reliable persons, will afford a very good estimate, not only of the general amount of sickness, the kinds most prevalent, the general degree of severity and mortality, but, after a sufficient period of time, the relation which the different circumstances bear to the condition of the public health. No advantage will be taken of correspondents, in regard to any communication they may be disposed to make, and no physician's practice can in any way be inquired into. I shall take pleasure in sending you a copy of the Annual Report of the Board, now nearly through the press.

Enclosed please find stamped envelope for *Return*.

Yours very truly,

CHAS. H. FISHER, Sec.

Tabulated summaries of the monthly reports will be found in the following pages.

Tabulated Summary of Reports of acute diseases prevailing in the several towns during

JANUARY, 1879.

TOWNS.	Bronchitis.	Diphtheria.	Diarrhoea.	Croup.	Whooping Cough.	Catarrh.	Influenza.	Pneumonia.	Rheumatism.	Scarlatina.	Pharyngitis.	Diseases of Brain.	Humidity of atmosphere.	Temperature.	Fluctuations.
Barrington*.....
Bristol.....
Warren.....
Coventry.....
East Greenwich.....
West Greenwich.....
Warwick.....
Little Compton.....
Middletown.....
Portsmouth.....
Tiverton.....
Newport City.....
Burrillville.....
Cranston.....
Cumberland.....
East Providence.....
Foster.....
Glocester.....
Johnston.....
Lincoln.....
North Providence.....
North Smithfield.....
Pawtucket.....
Scituate.....
Smithfield.....
Woonsocket.....
Providence City.....
Charlestown.....
Exeter.....
Hopkinton.....
North Kingstown.....
South Kingstown.....
Richmond.....
Westerly.....

* N. B.—Figure 1 indicates the disease affecting the largest number of persons. Fig. 2, the next largest number, and so on. The letters following the figures denote the degree of severity, s. signifying severe, a. average, and m. mild. The letters in the meteorological columns indicate as follows: g. greater, l. less or lower, a. average, h. higher. They show the relative temperature, humidity, and frequency of change compared with the average of corresponding months of previous years.

Tabulated Summary of Reports of acute diseases prevailing in the several towns during

FEBRUARY, 1879.

TOWNS.	Bronchitis.	Croup.	Diphtheria.	Hooping Cough.	Catarrhal Inflammation.	Pneumonia and Pleurisy.	Rheumatism.	Scarlatina.	Pharyngitis and Quinsy.	Mumps.	Dysentery.	Humidity of atmosphere.	Temperature.	Fluctuations.
Barrington*.....	2	5 a.	.....	.....	1 a.	1 a.	4 m.	.....	3 a.	.....	.....	1	1	22
Bristol.....	2	4 a.	.....	.....	1 a.	1 m.	5 m.	.....	.....	.....	.....	1	1	22
Warren.....	2	4 a.	.....	.....	1 a.	1 m.	5 m.	.....	.....	.....	.....	1	1	22
East Greenwich.....	2	4 a.	.....	.....	1 a.	1 m.	5 m.	.....	.....	.....	.....	1	1	22
West Greenwich.....	2	4 a.	.....	.....	1 a.	1 m.	5 m.	.....	.....	.....	.....	1	1	22
Warwick.....	2	4 a.	.....	.....	1 a.	1 m.	5 m.	.....	.....	.....	.....	1	1	22
Little Compton.....	2	4 a.	.....	.....	1 a.	1 m.	5 m.	.....	.....	.....	.....	1	1	22
Middletown.....	2	4 a.	.....	.....	1 a.	1 m.	5 m.	.....	.....	.....	.....	1	1	22
Portsmouth.....	2	4 a.	.....	.....	1 a.	1 m.	5 m.	.....	.....	.....	.....	1	1	22
Tiverton.....	2	4 a.	.....	.....	1 a.	1 m.	5 m.	.....	.....	.....	.....	1	1	22
Burrillville.....	2	4 a.	.....	.....	1 a.	1 m.	5 m.	.....	.....	.....	.....	1	1	22
Cranston.....	2	4 a.	.....	.....	1 a.	1 m.	5 m.	.....	.....	.....	.....	1	1	22
Cumberland.....	2	4 a.	.....	.....	1 a.	1 m.	5 m.	.....	.....	.....	.....	1	1	22
East Providence.....	2	4 a.	.....	.....	1 a.	1 m.	5 m.	.....	.....	.....	.....	1	1	22
Foster.....	2	4 a.	.....	.....	1 a.	1 m.	5 m.	.....	.....	.....	.....	1	1	22
Glocester.....	2	4 a.	.....	.....	1 a.	1 m.	5 m.	.....	.....	.....	.....	1	1	22
Johnston.....	2	4 a.	.....	.....	1 a.	1 m.	5 m.	.....	.....	.....	.....	1	1	22
Lincoln.....	2	4 a.	.....	.....	1 a.	1 m.	5 m.	.....	.....	.....	.....	1	1	22
North Providence.....	2	4 a.	.....	.....	1 a.	1 m.	5 m.	.....	.....	.....	.....	1	1	22
North Smithfield.....	2	4 a.	.....	.....	1 a.	1 m.	5 m.	.....	.....	.....	.....	1	1	22
Pawtucket.....	2	4 a.	.....	.....	1 a.	1 m.	5 m.	.....	.....	.....	.....	1	1	22
Scituate.....	2	4 a.	.....	.....	1 a.	1 m.	5 m.	.....	.....	.....	.....	1	1	22
Smithfield.....	2	4 a.	.....	.....	1 a.	1 m.	5 m.	.....	.....	.....	.....	1	1	22
Woonsocket.....	2	4 a.	.....	.....	1 a.	1 m.	5 m.	.....	.....	.....	.....	1	1	22
Providence City.....	2	4 a.	.....	.....	1 a.	1 m.	5 m.	.....	.....	.....	.....	1	1	22
Charlestown.....	2	4 a.	.....	.....	1 a.	1 m.	5 m.	.....	.....	.....	.....	1	1	22
Exeter.....	2	4 a.	.....	.....	1 a.	1 m.	5 m.	.....	.....	.....	.....	1	1	22
Rockington.....	2	4 a.	.....	.....	1 a.	1 m.	5 m.	.....	.....	.....	.....	1	1	22
North Kingstown.....	2	4 a.	.....	.....	1 a.	1 m.	5 m.	.....	.....	.....	.....	1	1	22
Richmond.....	2	4 a.	.....	.....	1 a.	1 m.	5 m.	.....	.....	.....	.....	1	1	22
Westerly.....	2	4 a.	.....	.....	1 a.	1 m.	5 m.	.....	.....	.....	.....	1	1	22

* For explanation see foot note page 187.

MARCH AND APRIL.

The reports of prevailing acute diseases, not contagious or infectious, in the different towns, for the months of March and April, were so uniform in the statement, that it was difficult to say, which, among the four or five most prominent diseases prevalent, affected the largest number of persons, and the range of diseases was so limited, that it has seemed unnecessary to present the returns in tabular form for those months.

The names of the acute diseases prevailing during those months are given, with the understanding that all, not contagious or infectious, were uniformly above the average degree of severity, and were very evenly distributed throughout the State. They were as follows, and with slight variations, were in the degree of greatest prevalence, in the order in which they are here given, viz: Inflammation of the throat, acute catarrh, acute bronchitis, inflammation and congestion of the lungs, and rheumatism; croup and inflammation and congestion of the brain were reported, but were of less prevalence.

The contagious or infectious diseases, scarlatina, diphtheria, hooping cough, measles and mumps, were reported in quite limited numbers and generally of mild form, during the months above named, from only a few towns in the State.

These reports, if *faithfully* and *fully* made out in regular monthly periods, will afford facilities for studying the spread of the contagious and infectious diseases, in regard to the mode of transportation or travel, that is, whether they are communicated from one town to another in a direct line of travel as a rule, where communication is frequent and uninterrupted; or whether their mode of travel is by leaping over portions of territory as it were, and reappearing in towns or places at a distance, and not contiguous with those where they had prevailed at a time immediately preceding. If it should be found that any one of the contagious or infectious diseases which is in any important degree fatal to life, moved in any regular and straightforward path, it would be a fact of great value, as affording to those who were seemingly in its line of travel, an opportunity at least to prepare for its approach and presence, if it did not indeed afford the possibility of arresting its progress altogether. It is only by collecting a

great number of observations, and a comparison of them when so collected, that the nature and characteristics of all diseases, whether transmissible or not, can be ascertained. And it is also by a great number of observations made in any town or section, and reported from time to time, that it can be determined, with any degree of accuracy, what diseases that town or section is especially liable to, and what means may be taken for their prevention or restriction.

Tubulated Summary of Reports of acute diseases prevailing in the several towns during

JUNE, 1879.

TOWNS.	Nasal Passages.	Throat.	Bronchial Passages.	Lungs.	Croup.	Rheumatism.	Diphtheria.	Hoopling Cough.	Scarlet Fever.	Typhoid Fever.	Measles.	Degree of severity.	Neuralgia and nerve de- rangements.	Dysentery and Diarrhoea.	Humidity of atmosphere and soil.	Average temperature.	Fluctuations.
East Greenwich*																	
Warwick		4 a		6 m.		5 a	1 m.	4 a	2 a	5 m.						2	2
Little Compton		1 m.	2 m.			5 a	1 a		2 m.							2	2
Tiverton		3 a	3 a			3 m.										2	2
Newport City		2 a	3 a	1 m.		1 s.										2	2
Cumberland				4 s.		2 a				3 m.			2 a	4 m.		2	2
Gloucester		1 m.	2 m.		4 a	3 a										2	2
Johnston		1 m.	2 m.			3 m.										2	2
Lincoln		1 m.	1 a	2 m.		3 m.	1 m.			4 m.						2	2
North Providence		2 a	1 a	3 m.		3 m.										2	2
North Smithfield		2 a	1 a	3 m.		3 m.										2	2
Pawtucket		1 a	1 a	3 m.		3 m.										2	2
Scituate		1 a	1 a	3 m.		3 m.										2	2
Smithfield			1 a	3 m.		3 m.										2	2
Woonsocket	2 m.		1 m.	3 a		3 a										2	2
Providence City			5 a	3 a		3 a	1 a		4 a	3 a				6 a		2	2
Hopkinton			2 m.	3 m.		3 m.										2	2
South Kingstown	1 m.		2 m.			3 m.										2	2
Westerly	1 m.	5 a				1 a	6 m.	4 m.			3 m.					2	2

* For explanation see foot note page 157. During June the range of temperature was less, with frequent fluctuations.

Tabulated Summary of Reports of acute diseases prevailing in the several towns during

JULY, 1879.

TOWNS.	Nasal Passages.	Throat.	Bronchial Passages.	Lungs.	Diphtheria.	Whooping Cough.	Scarlet Fever.	Typhoid Fever.	Dysentery and Diarrhea.	Cholera Infantum.	Degree of severity.	Cholera Morbus.	Degree of severity.	Humidity of atmosphere and soil.	Average temperature.	Fluctuations.
East Greenwich*.		5 m.						1 s.	2 s.	1 s.	1 s.	4 m.	4 m.	99	1	99
Little Compton.		4 s.			3 s.		2 m.			1 s.	1 s.			99	1	99
Portsmouth.			a.		1 m.			5 m.			3 s.	4 s.	4 s.	99	1	99
Tiverton.			3 m.						1 s.	1 s.	1 s.			99	1	99
Burrillville.					5 s.		4 m.	4 s.		1 s.	1 s.	3 m.	3 m.	99	1	99
Cranston.		2 m.				5 s.		3 m.		1 s.	1 s.	2 s.	2 s.	99	1	99
Cumberland.			2 s.						1 s.	1 s.	1 s.			99	1	99
East Providence.			4 m.							1 s.	1 s.			99	1	99
Foster.										1 s.	1 s.			99	1	99
Glocester.										1 s.	1 s.			99	1	99
Johnston.		5 s.	2	3 s.	5 s.		4 s.		1 s.	1 s.	1 s.	2 s.	2 s.	99	1	99
Lincoln.									1 s.	1 s.	1 s.	2 s.	2 s.	99	1	99
North Providence.			2 m.				4 s.		1 s.	1 s.	1 s.	2 s.	2 s.	99	1	99
North Smithfield.	3 s.							1 s.	2 m.	1 s.	1 s.	2 s.	2 s.	99	1	99
Pawtucket.							4 m.	4 m.	1 s.	1 s.	1 s.	2 s.	2 s.	99	1	99
Scituate.									1 s.	1 s.	1 s.	2 s.	2 s.	99	1	99
Smithfield.		5 s.	2 m.	3 s.					1 s.	1 s.	1 s.	2 s.	2 s.	99	1	99
Woonsocket.	3 s.		2 m.				5 s.	3 s.	1 s.	1 s.	1 s.	2 s.	2 s.	99	1	99
Providence City.			4 m.		7 s.	6 s.			1 s.	1 s.	1 s.	2 s.	2 s.	99	1	99
Westerly.				4 m.	4 m.			3 m.	2 s.	1 s.	1 s.	5 s.	5 s.	99	1	99

* For explanation see foot note page 157. The extremes of temperature were less in July than the average of years.

Tabulated Summary of Reports of acute diseases prevailing in the several towns during

AUGUST, 1879.

TOWNS.	Bronchial Passages.	Diphtheria.	Scarlet Fever.	Typhoid Fever.	Dysentery and Diarrhoea.	Cholera Infantum.	Cholera Morbus.	Erysipelas.	Rheumatism.	Degree of severity.	Humidity of soil and atmosphere.	Average temperature.	Fluctuations.
East Greenwich*	4 m.	2 a.	4 a.	1 a.	1 m.	3 a.	2 a.	4 m.	5 m.	.....	.....	.....	.....
Warwick.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Little Compton.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Portsmouth.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Tiverton.....	4 a.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cranston.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cumberland.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
East Providence.....	4 m.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Foster.....	3 m.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Glocester.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Johnston.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Lincoln.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
North Providence.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
North Smithfield.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pawtucket.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Scituate.....	5 m.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Smithfield.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Woonsocket.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Providence City.....	4 m.	8 m.	5 a.	6 m.	1 a.	2 a.	3 a.	.....	7 m.	.....	.....	.....	.....
South Kingstown.....	2 m.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Westerly.....	.....	6 a.	4 a.	5 a.	2 m.	1 m.	3 a.	.....	.....	.....	.....	.....	.....

* For explanation see see foot note page 157. The variations of temperature in August were less in degree, fluctuations frequent.

Tabulated Summary of Reports of acute diseases prevailing in the several towns during

SEPTEMBER, 1879.

TOWNS.	Throat.	Bronchial Passages.	Lungs.	Diphtheria.	Scarlet Fever.	Typhoid Fever.	Dysentery.	Diarrhoea.	Cholera Infantum.	Rheumatism.	Degree of severity.	Humidity of soil.	Average Temperature.	Fluctuations.
Bristol*	8 m.					9 m.	2 m.	1 m.	5 m.	4 m.			71	9
Warren	4 a.					1 m.	2 m.	1 m.					71	9
East Greenwich			6 s.	3 m.	3 m.	1 m.	4 s.	1 m.		2 m.			71	9
Warwick	6 m.					1 m.	4 s.	1 m.		3 m.			71	9
Little Compton						2 s.	1 m.	1 m.					71	9
Portsmouth						2 s.	1 m.	1 m.					71	9
Tiverton			2 s.	3 m.	1 a.	2 s.	1 m.	1 m.					71	9
Cambridge		4 m.	2 s.	3 m.	6 m.	2 s.	1 m.	1 m.		5 m.			71	9
East Providence			2 s.	4 a.		1 s.	1 m.	1 m.					71	9
Providence		2 m.	2 m.			1 s.	1 m.	1 m.					71	9
Gloster		2 m.	2 m.			1 s.	1 m.	1 m.					71	9
Johnston		2 m.	2 m.			1 s.	1 m.	1 m.					71	9
Lincoln		4 m.	2 m.	1 m.	2 a.	3 a.	2 a.	1 m.		5 m.			71	9
North Providence.		2 m.	2 m.	3 m.	2 a.	1 m.	1 a.	1 m.					71	9
Pawtucket		2 m.	2 m.	3 m.	2 a.	4 m.	1 a.	1 m.					71	9
Scituate		2 m.	2 m.					1 m.		2 m.			71	9
Providence City	3 a.	2 m.	3 a.	2 a.	1 s.	1 m.	1 m.	1 m.	4 a.				71	9
Hopkinton	6 a.	2 m.	3 a.	5 m.	4 m.	1 m.	1 m.	1 m.	3 m.				71	9
North Kingstown		2 m.	2 m.	3 a.		2 m.	1 m.	1 m.		4 m.			71	9
South Kingstown		2 m.	2 m.	3 a.		2 m.	1 m.	1 m.					71	9
Richmond		2 m.	2 m.	3 a.		2 m.	1 m.	1 m.					71	9
Westerly		7 a.	6 m.	5 s.	5 s.	4 m.	2 s.	1 m.	3 a.				71	9

* For explanation see foot note page 157. Temperature unusually uniform through the month.

Tabulated Summary of Reports of acute diseases prevailing in the several towns during

AUGUST, 1879.

TOWNS.	Bronchial Passages.	Diphtheria.	Scarlet Fever.	Typhoid Fever.	Dysentery and Diarrhoea.	Cholera Infantum.	Cholera Morbus.	Erysipelas.	Rheumatism.	Degree of severity.	Humidity of soil and atmosphere.	Average temperature.	Fluctuations.
East Greenwich*.	4 m.	2 a.	2 a.	1 a.	1 m.	3 a.	2 a.	2 m.	5 m.	5 m.	5 a.	5 a.	5 a.
Warwick.	2 a.	2 a.	4 a.	1 a.	1 m.	1 m.	2 a.	4 m.	4 m.	4 m.	4 a.	4 a.	4 a.
Little Compton.	4 a.	4 a.	4 a.	4 m.	4 m.	4 m.	4 a.	4 m.	4 m.	4 m.	4 a.	4 a.	4 a.
Portsmouth.	4 a.	4 a.	4 a.	4 m.	4 m.	4 m.	4 a.	4 m.	4 m.	4 m.	4 a.	4 a.	4 a.
Tiverton.	4 a.	4 a.	4 a.	4 m.	4 m.	4 m.	4 a.	4 m.	4 m.	4 m.	4 a.	4 a.	4 a.
Cranston.	4 m.	4 m.	4 m.	4 m.	4 m.	4 m.	4 a.	4 m.	4 m.	4 m.	4 a.	4 a.	4 a.
Cumberland.	4 m.	4 m.	4 m.	4 m.	4 m.	4 m.	4 a.	4 m.	4 m.	4 m.	4 a.	4 a.	4 a.
East Providence.	4 m.	4 m.	4 m.	4 m.	4 m.	4 m.	4 a.	4 m.	4 m.	4 m.	4 a.	4 a.	4 a.
Foster.	3 m.	3 m.	3 m.	3 m.	3 m.	3 m.	3 a.	3 m.	3 m.	3 m.	3 a.	3 a.	3 a.
Glocester.	3 m.	3 m.	3 m.	3 m.	3 m.	3 m.	3 a.	3 m.	3 m.	3 m.	3 a.	3 a.	3 a.
Johnston.	3 m.	3 m.	3 m.	3 m.	3 m.	3 m.	3 a.	3 m.	3 m.	3 m.	3 a.	3 a.	3 a.
Lincoln.	3 m.	3 m.	3 m.	3 m.	3 m.	3 m.	3 a.	3 m.	3 m.	3 m.	3 a.	3 a.	3 a.
North Providence.	3 m.	3 m.	3 m.	3 m.	3 m.	3 m.	3 a.	3 m.	3 m.	3 m.	3 a.	3 a.	3 a.
North Smithfield.	3 m.	3 m.	3 m.	3 m.	3 m.	3 m.	3 a.	3 m.	3 m.	3 m.	3 a.	3 a.	3 a.
Pawtucket.	3 m.	3 m.	3 m.	3 m.	3 m.	3 m.	3 a.	3 m.	3 m.	3 m.	3 a.	3 a.	3 a.
Scituate.	3 m.	3 m.	3 m.	3 m.	3 m.	3 m.	3 a.	3 m.	3 m.	3 m.	3 a.	3 a.	3 a.
Smithfield.	3 m.	3 m.	3 m.	3 m.	3 m.	3 m.	3 a.	3 m.	3 m.	3 m.	3 a.	3 a.	3 a.
Woonsocket.	3 m.	3 m.	3 m.	3 m.	3 m.	3 m.	3 a.	3 m.	3 m.	3 m.	3 a.	3 a.	3 a.
Providence City.	4 m.	4 m.	4 m.	4 m.	4 m.	4 m.	4 a.	4 m.	4 m.	4 m.	4 a.	4 a.	4 a.
South Kingstown.	2 m.	2 m.	2 m.	2 m.	2 m.	2 m.	2 a.	2 m.	2 m.	2 m.	2 a.	2 a.	2 a.
Westerly.	2 m.	2 m.	2 m.	2 m.	2 m.	2 m.	2 a.	2 m.	2 m.	2 m.	2 a.	2 a.	2 a.

* For explanation see see foot note page 187. The variations of temperature in August were less in degree, fluctuations frequent.

Tabulated Summary of Reports of acute diseases prevailing in the several towns during

SEPTEMBER, 1879.

TOWNS.	Throat.	Bronchial Passages.	Lungs.	Diphtheria.	Scarlet Fever.	Typhoid Fever.	Dysentery.	Diarrhoea.	Cholera Infantum.	Rheumatism.	Degree of severity.	Humidity of soil.	Average Temperature.	Fluctuations.
Bristol*	3 m.													
Warren	4 a.													
East Greenwich			6 s.	3 m.	3 m.	3 m.	3 m.	1 m.	5 m.	4 m.				
Warwick	6 m.			3 m.		1 m.	5 m.	5 m.		3 m.				
Little Compton				4 m.		3 m.	1 m.	1 m.		3 m.				
Portsmouth				3 m.	1 a.	3 m.	1 m.	1 m.		3 m.				
Tiverton	4 m.		3 s.	4 m.	6 m.			2 m.		5 m.				
Cumberland			5 a.	4 a.			1 m.	2 m.						
East Providence						3 m.	1 m.	2 m.						
Foster	3 m.					1 a.								
Glocester	3 m.													
Johnston			5 m.	1 m.	2 a.	3 a.		4 m.						
Lincoln		4 m.	3 s.	3 m.	2 a.	1 m.	2 a.	4 m.		5 m.				
North Providence			5 a.		2 a.			1 a.						
Pawtucket		3 m.	5 a.	3 m.	2 a.	4 m.	1 a.	1 m.						
Scituate	3 a.	7 m.	3 a.	2 a.	1 s.		1 m.	1 m.		2 m.				
Providence City	6 a.	6 a.		5 m.	4 m.	1 m.	1 m.	1 m.	3 m.					
East Greenwich														
North Kingstown				3 a.			1 m.	1 m.		4 m.				
South Kingstown				3 a.			2 m.	1 m.						
Richmond				6 m.	5 s.	4 m.	2 m.	1 m.	3 a.					
Westerly	7 a.						2 m.	1 m.						

* For explanation see foot note page 187. Temperature unusually uniform through the month.

Tabulated Summary of Reports of acute diseases prevailing in the several towns during

OCTOBER, 1879.

TOWNS.	Throat.	Bronchial passages.	Lungs.	Diphtheria.	Scarlet Fever.	Typhoid Fever.	Dysentery and Diarrhea.	Rheumatism.	Degree of severity.	Group.	Degree of severity.	Humidity of soil and atmosphere.	Average Temperature.	Fluctuations.
Bristol*	2 a.	4 a.	6 a.	2 m.	3 m.	1 m.	1 m.	3 m.	1 m.	3 m.	1 m.	1	44	a
Warren	3 a.	4 a.	6 a.	2 m.	3 m.	1 m.	1 m.	3 m.	1 m.	3 m.	1 m.	1	44	a
East Greenwich.	3 a.	4 a.	6 a.	2 m.	3 m.	1 m.	1 m.	3 m.	1 m.	3 m.	1 m.	1	44	a
Warwick.	3 a.	4 a.	6 a.	2 m.	3 m.	1 m.	1 m.	3 m.	1 m.	3 m.	1 m.	1	44	a
Little Compton.	3 a.	4 a.	6 a.	2 m.	3 m.	1 m.	1 m.	3 m.	1 m.	3 m.	1 m.	1	44	a
Portsmouth.	3 a.	4 a.	6 a.	2 m.	3 m.	1 m.	1 m.	3 m.	1 m.	3 m.	1 m.	1	44	a
Tiverton.	3 a.	4 a.	6 a.	2 m.	3 m.	1 m.	1 m.	3 m.	1 m.	3 m.	1 m.	1	44	a
Cumberland.	3 a.	4 a.	6 a.	2 m.	3 m.	1 m.	1 m.	3 m.	1 m.	3 m.	1 m.	1	44	a
East Providence.	3 a.	4 a.	6 a.	2 m.	3 m.	1 m.	1 m.	3 m.	1 m.	3 m.	1 m.	1	44	a
Foster.	3 a.	4 a.	6 a.	2 m.	3 m.	1 m.	1 m.	3 m.	1 m.	3 m.	1 m.	1	44	a
Gloucester.	3 a.	4 a.	6 a.	2 m.	3 m.	1 m.	1 m.	3 m.	1 m.	3 m.	1 m.	1	44	a
Johnston.	3 a.	4 a.	6 a.	2 m.	3 m.	1 m.	1 m.	3 m.	1 m.	3 m.	1 m.	1	44	a
Lincoln.	3 a.	4 a.	6 a.	2 m.	3 m.	1 m.	1 m.	3 m.	1 m.	3 m.	1 m.	1	44	a
North Providence.	3 a.	4 a.	6 a.	2 m.	3 m.	1 m.	1 m.	3 m.	1 m.	3 m.	1 m.	1	44	a
Pawtucket.	3 a.	4 a.	6 a.	2 m.	3 m.	1 m.	1 m.	3 m.	1 m.	3 m.	1 m.	1	44	a
Scituate.	3 a.	4 a.	6 a.	2 m.	3 m.	1 m.	1 m.	3 m.	1 m.	3 m.	1 m.	1	44	a
Providence City.	3 a.	4 a.	6 a.	2 m.	3 m.	1 m.	1 m.	3 m.	1 m.	3 m.	1 m.	1	44	a
Charlestown.	3 a.	4 a.	6 a.	2 m.	3 m.	1 m.	1 m.	3 m.	1 m.	3 m.	1 m.	1	44	a
Hopkinton.	3 a.	4 a.	6 a.	2 m.	3 m.	1 m.	1 m.	3 m.	1 m.	3 m.	1 m.	1	44	a
South Kingston.	3 a.	4 a.	6 a.	2 m.	3 m.	1 m.	1 m.	3 m.	1 m.	3 m.	1 m.	1	44	a
Westerly.	3 a.	4 a.	6 a.	2 m.	3 m.	1 m.	1 m.	3 m.	1 m.	3 m.	1 m.	1	44	a

*For explanation see foot note page 157. Temperature quite uniform for the month

NOVEMBER, 1879.

* For explanation see foot note page 157. Small range of temperature during the month.

* For explanation see foot note page 157.

Tabulated Summary of Reports of acute diseases prevailing in the several towns during

DECEMBER, 1879.

TOWNS.	Nasal Pass-	Agar, Degree of se-	Throat, Degree of se-	Bronchial, Degree of se-	Parasages, Degree of se-	Lungs, Degree of se-	Diphtheria, Degree of se-	Scarlet Fever, Degree of se-	Typhoid Re- ver, Degree of se-	Dysentery and Diarrhea, Degree of se-	Rheumatism, Degree of se-	Measles, Degree of se-	Brain, Degree of se-	Hoop- ing, Degree of se-	Cough, Degree of se-	Average hu- midity of air, verity.	Aver. Temp- erature.	Fluctuations.
Barrington*																		
Bristol																		
Warren	2 a.																	
Coventry																		
East Greenwich																		
Warwick																		
Little Compton	3 m.																	
Middletown																		
Portsmouth																		
Tiverton																		
Newport City																		
Burrillville																		
Cranston																		
Cumberland																		
East Providence																		
Dorchester																		
Glocester																		
Yonkers																		
Lincoln																		
North Providence																		
North Smithfield																		
Pattucket																		
Smithfield																		
Wrentham																		
Providence City																		
Charlestown																		
Exeter																		
Hopkinton																		
North Kingstown																		
South Kingstown																		
Richmond																		
Westerly																		

* For explanation see foot note page 157. Range of temperature about an average.

It will be seen that the tabulated summaries of the monthly reports do not give the results of observations under all the headings and in all the divisions of the "Return of Diseases." It may be said in regard to that omission, that many of the observations desired of correspondents were for the purpose of private sanitary study and comparison, and had the specific object in view of endeavoring to ascertain what relations existed between certain diseases, not only with each other, but also with the attendant conditions of degree of moisture and warmth, and the conditions and circumstances peculiar to localities. Not having been designed primarily for a public report, they have not been introduced into the tabulated summary of diseases.

It may be observed here, and an examination of the monthly summaries will show, that, taking the record of the year 1879 as the rule, the meteorological conditions of the several towns for the same periods of time are quite uniform throughout the state. And the uniformity having continued so steadily through the twelve months of the year, would seem to settle the question, presumably at least, that such observations made at some central point, or at two or three points, which might cover the possible differences between the conditions of the inland towns and those upon the bay and sea-shore, would answer for all practical purposes for all the towns in the state.

And it should also be further stated, that correspondents have largely neglected to fill the blanks in the "Return of Diseases," which are not introduced into the tabulated monthly summaries, and the result has been that their value for the purpose designed has fallen very short of that which was earnestly hoped and desired. For the reason that a general disposition has been manifested on the part of correspondents to pass over the conditions alluded to in their monthly reports, it will be the intention hereafter to leave such returns out altogether and very probably, from other reasons already stated, the monthly reports may only require an account of the diseases most prevalent.

As the end of the year approached, it seemed quite desirable that a general report, embodying several special features not forming any part of the monthly returns, should be obtained from the several correspondents of the Board.

With that object in view, the following circular, which will sufficiently explain itself, was forwarded to each correspondent.

(CIRCULAR F.)

FROM THE OFFICE OF THE STATE BOARD OF HEALTH.

To the Correspondents of the Board :

In addition, and supplementary to, the *monthly* returns from correspondents, the Secretary greatly desires a comprehensive report, embodying not only the status of the public health during the year 1879, but also a description of such topographical and industrial features, conditions and circumstances, as appertain to each of the several towns, or smaller areas, and which may possibly or presumably have relation to the production of disease. The following questions and suggestions are offered, as indicating the general plan upon which such report may be based, but subject to such modifications and extensions as each correspondent may deem necessary, to more fully represent the peculiar circumstances of his locality.

The whole or portions of these reports will form a part of the Second Annual Report of the State Board of Health, and will also be kept on file for future reference. They should be sent to the Secretary of the Board as soon after January 1, 1880, as they can be conveniently, and in any case not later than January 31st. If the stamp on the enclosed envelope be insufficient to cover postage on any extended consideration of the topics suggested, or of any questions connected with sanitary science, the additional postage will be immediately refunded on receipt of papers. The reports may be more conveniently divided into classes.

CLASS I.

1. Name of city or town, and circuit.
2. What has been the proportionate amount of sickness of all kinds in your town or circuit during the year 1879, compared with previous years? Greater, or less? and if either, how much? Approximate estimation.
3. What has been the proportion of deaths from all causes in the same territory compared with previous years? Estimated.
4. What epidemics have prevailed in your section during the year 1879? Name them in their order of occurrence as to dates, if any, and length of continuance; and state the degree of severity, and the localities in which they were prevalent.
5. What endemic diseases, if any, have prevailed in your circuit during the year 1879? and what the localities in which they occurred?
6. What, in your opinion, is the cause, or the several causes, of the endemics mentioned, if any?

7. What diseases not strictly endemic or epidemic, but of more universal occurrence, have prevailed in the course of the year, to an unusually large extent in your circuit?
8. What diseases have been attended with an unusual fatality?
9. Which of the following zymotic diseases, viz: Diphtheria, Typhoid Fever, Hooping Cough, Measles, Scarlet Fever and Small Pox, have not occurred in your circuit during the year?
10. Which of the above named diseases, if any, have occurred sporadically and what the localities of the occurrence?
11. What circumstances have occurred within your observation or knowledge; that seemed to indicate that Scarlet Fever, Diphtheria or Typhoid Fever had been taken, or communicated from one person to another? A full history of known facts in detail should be given, if any. Such history need not be confined to the year 1879. State on separate sheet.
12. What localities in your circuit do you consider peculiarly unhealthy? giving names and geographical position, and the diseases most prevalent, whether endemic or otherwise, and what you consider the causes of the peculiar unhealthiness.
13. To what extent does Opium or Arsenic eating prevail in your circuit? Please give estimated number of persons using the same, if any are known, and also your opinion in regard to the prevalence of the private use of any other deleterious drug.
14. What is the method of scavenging the streets, and removal of excretæ, and house refuse and garbage in the more densely populated portions of your town? and what the facilities of drainage, natural and artificial of the same?

In addition to Class I, it is quite important that the topography of the towns should be sketched and reported as a means of discovering what connection, if any, certain diseases have with the special natural features, hydrographic and geologic, and especially the constituents and conditions of the surface soil, or deeperearthy strata, and also as a means of ascertaining the probable source of water supply for drinking purposes, which plays so important a part in the production of disease. The following directions will suggest the points and kind of information sought:

CLASS II.

- A. Describe the streams of water of size sufficient to operate small mills, as well as larger, giving names, length in the town, source, direction, what dams upon them, permanence of size or volume, and variations during the year, with the kind of mills, if any, and number of each for which they furnish power; and into what streams they empty, or where they pass out of the town.
- B. Describe the ranges of hills, with their location in the town; the known or estimated elevation; the direction they run; whether sides are sloping or abrupt; estimated or exact area of each; whether the underlying rock crops out largely over the whole area, or is largely covered with soil; character of surface soil, whether principally sand, gravel or loam, whether retentive of moisture or not; character of sub-soil, whether largely of clay, lime, gravel or otherwise; proportion of woodland and open land, and average condition of vegetation, as to luxuriance of growth.
- C. Describe the location, and give the area, known or estimated, of the swamps, water-soaked boggy land, ponds and reservoirs of ten acres or more: their condition during the latter part of summer, or during a long dearth of rain-fall; their proximity to villages, and names of same. Smaller water pens should be described if they have any peculiarly unsanitary connections, as for instance, if they are the receptacles of drainage from slaughter houses, tan yards, large cattle or hog yards, etc.
- D. Describe the location of all the larger valleys, their direction, area or general width and length, how watered, slope of sides, and character of soil, same as for the hills.
- E. Describe the location of the large plains, and elevated plateaus; their general characteristics of surface and soil, as in the preceding suggestions.
- F. Give the estimated depth of the wells in each of the previously described topographical sections, and especially in the villages, with the probable source of water in the wells of each of the named villages, whether from river, pond, swamp or surface drainage. State also, so far as known, whether water in any given locality is soft, hard, or contains impurities, and kind of impurities, if known.
- G. Describe the geological strata of different sections of the town, if there is any marked variation, giving location, position, extent, dip, direction and character of the underlying rock formations, and such other strata as may be known. This last (Letter G.) of suggested descriptions, while very desirable, is not urged, and is left at the option of the correspondent.

It is hoped that no one of the other descriptions will be neglected, but if correspondents having a large township to describe, cannot go over the whole town in one report, it is suggested that the descriptions be quite thorough of such part as is taken, and the remainder left for another report. Or if the party, to whom this circular is sent, will inform the Secretary what portion of the town he will take, the Secretary will endeavor to find some other intelligent person or persons to take the remainder.

Any one desiring to make a map of his town or circuit, or any smaller locality for approved purposes, will have the assistance of the Board in the execution and defraying of the expenses of the same.

Correspondents will not necessarily follow in detail the order of arrangement presented above, but may choose, each his own method of presentation, only not failing to ascertain and communicate the desired information.

Any one receiving this circular, and feeling disposed to comply with the wishes of the Secretary, in reporting upon either or both of the classes named, will be supplied with stamped envelope for the same, by giving name and P. O. address upon the accompanying postal card, and return by mail.

Replies to questions under Class I, may be given in the spaces between the same, when affording sufficient room, otherwise on a separate sheet prefaced by a number corresponding to the number of the question.

CHAS. H. FISHER,

Dec. 13, 1879.

Sec. of the Board.

REPLIES TO CIRCULAR F.

The following reports from the several cities, towns and villages of the state, will give a good representation of the general status of the public health for 1879, the presence or absence of epidemics and endemics in the several locations, and also remarks upon various topics of interest to every citizen having the welfare of the communities of the state at heart.

WARREN AND EASTERN PART OF BARRINGTON.

1. Proportionate amount of sickness less than in ordinary years.
4. No general epidemics have prevailed.
5. Catarrhal Tonsillitis and Follicular Pharyngitis have seemed to have been endemic.

6. The causes are believed to be filth, poor drainage, and bad ventilation of the packed tenements, in the locality where they occurred.
8. Pneumonia has been attended with unusual fatality.
9. Hooping Cough, Measles and Small Pox have not prevailed. Diphtheria and Scarlet Fever in small extent.
10. Typhoid Fever has prevailed more largely in North Warren, which is proverbially unhealthy, and all zymotic diseases have larger prevalence there than elsewhere in the town.
13. A few Opium eaters. None of Arsenic.
14. Surface drainage by gutters. The main streets are well cared for. Elsewhere in the town, scavenging is not looked after very attentively.

G. L. CHURCH.

ANSWER TO QUESTION 11, CLASS I.

There occurred in the family of Henry Manchester, about three years since, the following cases of Typhoid Fever, viz : A son-in-law of H. M. was sick and died in Providence, and was attended by the wife of Henry Manchester. She returned to Warren, and in about seven days was taken with the same disease, and died a few days after. Then in about the average period of time for contagious diseases to be developed, a son of H. M. was sick of the same disease, and died after about the same period of sickness. Then in about the same length of time, another son was attacked and died of the same disease. The three persons named were in good health previous to this fatal sickness.

I had a similar experience with the contagion with Diphtheria in my own family, about two years since. My daughter-in-law had the disease lightly, and communicated it to her son, about eighteen months old, who died. The child gave it to his father, who had the disease quite severely, but recovered. One son about three years old, who was kept separate from the family, escaped the disease.

OBADIAH CHACE.

IN REPLY TO NO. 11.

I have known Scarlet Fever to be communicated from one person to another. Some years since, a nurse in my circuit went into the country to take the care of a person sick with Scarlet Fever; the patient died in a week or so. The nurse came back to her home, which was in the chambers of a house in this town. A little girl, living below stairs in the same house, went up stairs, and sat in the lap of the nurse most of the evening after she came home. In two or three days the little girl came down with Scarlet Fever, and died in one week. No other cases in town.

Several years since, the Scarlet Fever prevailed quite extensively in Bristol, four miles from this town. Quite a number died from the disease. A man in my circuit, living in Barrington, was at Bristol at work; took the disease from one of the boarders, and came home. He held his little girl, three or four

years old, in his lap nearly all of the first evening. She took the Scarlet Fever and died in a week. The Scarlet Fever was not and did not prevail in Barrington in that year.

It seems to me that these cases were communicated from person to person.

OTIS BULLOCK.

IN REPLY TO NO. 11.

A servant, aged eighteen, employed in family, where a year and a half ago, a fatal case of Scarlet Fever had occurred, was directed to renovate the room where the patient had remained during the fever, the room having remained nearly untouched since. She removed and shook carpets, cleansed the room and thoroughly overhauled it. Within two weeks she was attacked with the fever. She passed through safely the general course of the fever. Symptoms prominent and desquamation general over the whole surface; recovered.

Two years ago, we had an epidemic of Scarlet Fever, commencing with severe types and attended by many deaths. In one family, four children in north part of town (Warren Manufacturing Co.'s land) and two in another; proved fatal, while a large number of families lost one member.

I think that here the spread was infectious rather than contagious, as cases cropped up very remote from each other, and no immediate communication being known, or at least, in general. Reports are circulated at present of cases here and there, without much foundation. By inquiry, they generally are found to be Follicular Pharyngitis or Tonsillitis of a peculiar character. C.

COVENTRY.—CIRCUIT: COVENTRY, SOUTH FOSTER, AND WEST GREENWICH.

2. The proportionate amount of sickness of all kinds during the year 1879, has been greater by about one-eighth.
3. The proportion of deaths from all causes in the same territory, compared with previous years, has been less, if anything.
4. Rheumatism, Acute, Articular, throughout the year; and during summer especially Bilious Fevers, Slow. The former on low lands, and the latter on high land among farmers mostly, and often very *obstinate cases*.
5. Asthma and Typhoid Dysentery, have seemed endemic. Asthma chiefly on high land, in farming districts. Typho-Dysentery on flats and in villages where lodgings were unventilated and water bad.
7. Rheumatism and Bilious Fevers, have prevailed more extensively than usual.
8. A large percentage from Scarlet fever, (and old age).
9. Small Pox; have not had a single case.
10. Diphtheria, Typhoid Fever and Scarlet Fever, have occurred sporadically, in various sections of the town.

11. Last March I attended five cases of Scarlet Fever in one house; two cases of malignant form. The house was soon vacated and another family took possession. Six months later I attended two cases of Scarlet fever in same house, one quite severe. History was: the children had seen no strangers; had not been away from home; but two (2) weeks before, found some old paper, rags, etc., which the other family left in a small room. They played with the same several hours, and, and in my opinion took the Scarlet Fever from those old clothes and rags.
12. Coventry Centre, and immediate vicinity, I consider very unhealthy. Situate on low land and surrounded by shallow ponds and newly made reservoirs. Most prevalent disease at all seasons in 1879, Diphtheria and Typhoid Fever.
F. B. SMITH.
13. Opium eaters (consumers), five in number.
14. Drainage very good where needed. This is in the main a farming community.

EAST GREENWICH AND PARTS OF WARWICK AND NORTH KINGSTOWN.

2. The proportionate amount of sickness of all kinds during the year 1879, compared with previous years, has been about an average, but below rather than above.
3. The proportion of deaths from all causes in the same territory, compared with previous years, has been slightly below the average.
4. The following epidemics have prevailed during the year 1879: Catarrhal Influenza in the first quarter; Rheumatism and Pneumonia in latter part of winter and spring—not very severe; Whooping Cough in summer and fall; Typhoid Fever late summer and fall; Scarlet Fever and Mumps fall and winter; some Diphtheria in December.
5. No endemics proper. Rheumatism, Pneumonia and Typhoid Fever—attributed to the season, the weather, and in the last named, to some faulty drainage or impurity of drinking water in localities.
6. As stated above, but not certainly known.
7. The diseases not strictly endemic or epidemic, which have prevailed in the course of the year, to an unusually large extent in this circuit are Mumps, Whooping Cough and Typhoid Fever.
8. The diseases attended with an unusual fatality have been organic diseases of the heart in Syncope—dying suddenly.
9. No Small-Pox or Measles.
10. No zymotic diseases have occurred sporadically not traceable to some source of infection.
12. There are no localities in this vicinity which can be considered peculiarly unhealthy. There is more sickness proportionally among the factory villages, and we attribute this to the occupation and mode of living, rather than to natural features of locality.

13. Some cases are known where morphine is used habitually in great quantity—say 1 ounce per week—but not many and no other drug than opium and its preparations.

14. The methods of scavenging the streets, and removal of excretæ, and house refuse and garbage are no other than surface drainage, and offal removed by carts from gutters and privy-vaults—not regularly; vaults and cess-pools not made tight; natural drainage very good.

J. H. ELDRIDGE.

TOPOGRAPHY.

(A.)

East Greenwich and parts of Warwick and North Kingstown adjoining are watered by two streams—Mascachug and Green's or Hunt's River.

The first rising from three sources in that part of Warwick known as Cowesett, which run in a southerly or southeasterly direction, unite and empty into Greenwich Cove at Mascachug. On this stream are two dams for reservoirs for a print works. There are no extensive marshes or swamps, and the brooks and ponds are often nearly dry in the late summer and fall.

The second is a larger stream, rising in that part of North Kingstown called Scrabbletown, and in that part of East Greenwich called Frenchtown, from many sources which unite at Davisville, and running easterly, empty in Narragansett Bay at Greene's Cove or Potowomut. On this river and its branches are many dams and ponds for mill purposes. At Davisville, is a large marshy pond of many acres, and another at Potowomut Factory less marshy and not so large. This river is never dry, and is not so liable to sudden freshets as the first. The mills upon the smaller branches are saw and grist mills; at Davisville a woolen mill and at Potowomut a cotton mill.

(B.)

East Greenwich and the adjacent parts of Warwick and North Kingstown are bounded on the east by waters of Narragansett Bay. At the village and for two miles and a half to the north, in the borders of Warwick the land rises somewhat abruptly from the water, until it reaches at a distance of half a mile from the shore, an elevation of one hundred and fifty to two hundred feet. This ridge runs north and south from the Drum Rock on the north, above the village of Apponaug, to the cliffs half a mile west of Greenwich. Near the shore the soil is sandy; on the ridge gravely, with rock and loose stone, and the western slope of this ridge is very much covered with wood and brush, cedar predominating. Potowomut, lying between Greenwich Cove and Greene's River, about two thousand acres in extent, with a sandy soil and smooth surface, with a general elevation of about thirty feet above high water.

That part of North Kingstown lying south of Green's River and on the bay is known as Quidnesset, having a rougher surface; a clayey soil, with much rock and loose stone and wood and brush.

(C.)

The only extensive bog or swamp within the district, is the pond, so called, at

Davis' Mills. This is some one hundred acres in extent, and portions of it so drained in latter part of the summer, as to be mown.

There are no unsanitary connections with this bog, except the swarms of mosquitos which infest the neighborhood and which are bred in this marsh.

(D.)

The valleys are not extensive—merely the water courses of small streams which intersect the country as you go in a westerly course; alternate ridge and valley, not alluvial bottoms, but bushy, swampy ravines.

(E.)

The only plains of any considerable extent are Potowomut and that part of Quidnesset lying near the shore, and not more than twenty-five or thirty feet above the surface of tide water. The soil is sandy, gravelly sub-soil.

(F.)

The average depth of the wells in the village of East Greenwich, where permanent supply of water has been reached, is about twenty-five (25) feet.

The springs which supply these wells come through seams in the rock which lie about fifteen feet below the surface, dipping toward the northeast at an angle of about 25° and intersected with open seams running in the course of the ledge, and with cross-seams at right-angles.

All springs above the rock are soon dried up. The water, when uncontaminated, is pure and soft and good for all purposes. Many wells have been found, on examination, to be contaminated. The water holding much organic matter in solution, not always apparent to the senses, and only detected by chemical examination. Many wells not carefully examined, and supposed to be good, are very probably badly contaminated by surface drainage. The drainage of the impurity being privy vaults and cess-pools which are purposely made open so that the water may drain off. The rock lying so near the surface and intersected as it is with seams, affords an easy means of conveyance from these reservoirs of filth.

These remarks apply to the wells in the village of East Greenwich especially. The wells in the remoter part of the town and vicinity present nothing peculiar.

J. H. E.

BURRILLVILLE.

In making a return for the past year (1879) for this locality, I can say, we have been remarkably free from epidemics of all kinds until about the first of November, when an epidemic of Hooping Cough broke out with considerable severity, causing several deaths among children under one year of age, and the cough, in some cases of older children, still continues. During the months of August, September and October, even into December, there were isolated cases of Typhoid Fever, showing a slight tendency to ulcerations about the throat (perhaps Diphtheritic), severe enough to cause some slight bleeding from pharynx. Some of these cases occurred in isolated localities where the drainage was exceptionally good, being on a high hill which sloped in all directions away from the house. In

this place, eight persons in one family were sick at one time; the father, aged about seventy-five years, and seven children, ages varying from seven to twenty years; all surviving, but making a slow recovery; two having bed-sores; another, partial loss of use of the lower limbs, which gradually subsided. It could not be traced to lack of ventilation, as the house was old, and the wind had free passage through the cracks, especially in the upper part of the house, which was unfinished and occupied by the children as sleeping apartments.

There have been no other cases of interest occurring in my locality.

H. J. BRUCE.

VALLEY FALLS, PARTS OF CUMBERLAND, LINCOLN AND PAWTUCKET.

2. The amount of general sickness during 1879 was less by one-sixth than the previous year.
3. The proportion of deaths very nearly the same.
4. A mild epidemic of diarrhæa in October. unusual from the lateness of the season, presumably caused by atmospheric changes. Also an epidemic of Hooping Cough, continuing through the fall months.
5. No endemic diseases.
7. No disease has assumed special prominence, either by its extent or severity.
8. No diseases attended with unusual fatality.
9. No cases of Small Pox.
10. Diphtheria, Typhoid Fever, Measles and Scarlet Fever have occurred to a limited extent, scattered indiscriminately through the communities.
11. In three instances two members of the same family have had Scarlet Fever. Two of these families sent the children to the same Kindergarten school. One child in each family came down with the disease within a week of the other, and was followed in about ten days by a younger child, who did not attend the school. There was no known instance of exposure to the disease in the first cases, nor did other members of the school contract the disease. In the other cases, four or five in number, there was no evidence to ascribe it to contagion. It would seem that the evidence in all these cases is of a rather negative character. Among the cases of Typhoid Fever there is no reason whatever to ascribe them to contagion. One case, and one only, occurred in a large factory boarding-house. All the cases were remote from each other.
12. The village of Valley Falls is exceptionally healthy, and no part of it noted for disease or mortality.
13. Only three or four persons are known to me to be habitual Opium eaters, and only one is suspected of eating Arsenic. The use of snuff, either by "dipping," or "rushing," is in quite extensive use among the female factory operatives. I have no knowledge of the private use of any other drug.

14. The streets in Valley Falls are provided with open paved gutters, which carry of the surface water, together with excreta, the detritus of the street, and refuse matter. Whatever accumulates in the gutters is removed in carts fall and spring. The contents of privy-vaults and cess-pools are removed in close carts, and whatever is valuable is utilized for fertilizing purposes. Most of the streets are graded in such a manner as to carry off the surface water, and obviate the dangers of stagnant pools.

G. B. HAINES.

TOPOGRAPHY.

(A.)

The Blackstone river passes through the western part of the village, running in a southeasterly course, and for about six miles forming the boundary of the towns of Cumberland and Lincoln. On this river, within the towns of Cumberland and Lincoln, are situated the mills of the Manville Company, Albion Company, Ashton Company, Lonsdale Company and Valley Falls Company, and near it the Berkeley Company, all engaged in the manufacture of cotton goods. These are all extensive works, and too well known to require any description. The volume of water is sufficient to furnish them power. The flow of water during droughts is very small, and is largely held back during a free flow in the reservoirs above the several dams. The water is of inferior purity, due to the large number of manufacturing establishments situated on its banks.

The Abbott Run river passes through the easterly part of Valley Falls village, and empties into the Blackstone. On this stream are a number of cotton factories of less extent. The volume of water varies greatly at different seasons of the year. Often the water in the summer is insufficient to carry the machinery of the mills. The water in this stream is of exceptional purity, and has been utilized by the town of Pawtucket as a source of water supply.

Carpenter's pond, of only about an acre in extent, is situated also in the easterly part of Cumberland and the westerly part of Attleboro'. A small stream flows from this pond into the Blackstone river.

(B.)

The larger part of the town of Cumberland is comprised in the territory lying between the Abbott Run river on the east and the Blackstone on the west. This is composed of a swell of land somewhat undulating and irregular, and rising at its highest elevation to a hundred and fifty or two hundred feet. It is no where precipitous. It is chiefly devoted to agriculture and grazing, and is of a fair degree of fertility. The forest trees are found on only a small proportion of the land—not more than an eighth, and they are fast disappearing. The underlying rock rarely crops out. Large boulders are found scattered over a great extent of the more elevated parts. The sub-soil is gravelly and porous.

(C.)

There are perhaps two or three hundred acres of low land on the borders of the Blackstone river. In the spring, during high water, these lands are submerged, but admit of cultivation during the summer. These lands are situated

from half a mile to two miles above the village of Valley Falls. The low lands on the Abbott Run river are very limited in extent. There are no stagnant pools of filthy water.

(D.)

The valleys follow the course of the streams. They are of small extent and usually cultivated.

(E.)

There are no large plains near this vicinity.

(F.)

The village is supplied with water for culinary and drinking purposes by wells, and for other purposes by cisterns. The wells vary in depth from twenty-five to eighty feet. The water probably filters into the wells from the surface. It is universally of good quality and very palatable. It contains very little organic or mineral impurities. It is not, however, so well adapted for washing and laundry purposes as cistern water.

(G.)

The only geological feature peculiar to this locality is an extensive underlying coal formation. This crops out in a few places. Several attempts have been made to mine it, but the quality of the coal is so poor as to prove worthless for fuel. The Blackstone Coal Mining Company are now engaged in mining it, to be used for foundry facing, for which purpose it is well adapted. It is prepared by drying it, and then grinding and bolting it.

There is one other subject that *may* have some sanitary value. I refer to the railroad facilities that this place enjoys. The Providence and Worcester Railroad passes through this village, forming a junction with the Massachusetts and Rhode Island Railroad. The India Point branch also terminates here—devoted exclusively to freight. On the Providence and Worcester road this is the terminus of the hourly train from Providence. By the roads easy and frequent communication is had with Providence, Worcester, Boston and intermediate stations. The repair shops of the P. & W. R. R. are soon to be established here.

Here also are located the extensive works of the Rhode Island Horse Shoe Company, thus giving to the village a varied industry, and helping to impart to it elements of a good sanitary character.

G. B. H.

FOSTER.

2. About the usual amount of general sickness.
3. Proportion of deaths rather large.
4. No epidemics, strictly speaking. Pneumonia and inflammations of the throat and air passages, prevailed largely in latter part of winter and spring. Typhoid Fever in the fall months rather severe. Other diseases about as usual.

5. No endemic diseases known to prevail in any locality in this town.
9. No Small Pox.
10. Diphtheria, Typhoid Fever, Measles, Scarlet Fever and bowel diseases generally, have occurred sporadically. Impure water believed to be the cause, or at least an aggravation of many cases of disease.
12. No localities peculiarly unhealthy.
13. But few Opium eaters. None of Arsenic known.

M. P. ARNOLD.

TOPOGRAPHY.

Rivers.—Ponaganset, largest; course southerly and easterly into Scituate. Hemlock the largest branch; Moosup, course southerly into Coventry. In the north part of the town the small streams empty into the Chestnut Hill ponds or reservoirs in Connecticut. Small streams empty into the Clayville reservoir, or Westcanaug reservoir in the southwest part of the town. Flat river, from the southeast limits of the town, runs into Coventry southerly for the Quidnic river. The hills and valleys follow the course of the rivers. Swamps small. Ponaganset valley large. Hills highest in the north part of the town; in some places abrupt, mostly sloping; granite crops out in various places, in the small hills. Among the rivulets of the Moosup, iron ore rock crops out, mostly, however, covered with granite. In the westerly, and north of the centre, bog iron ore is found. The table land, good grain land—some good alluvial soil, some not so good, but dry and generally quite smooth, having underneath gravel or clay. Hills, deep soil—rough, moist—hard-pan underneath. Good grazing and grass land. The hills are covered with forest trees to some extent. But little timber land in the central and south part. Wells from ten to forty-two feet deep, according to location, mostly soft and good water.

The height of the hills at the north part of the town, I should think was 500 feet above tide-water.

This town I consider very healthy.

The native rocks are mostly if not all, in layers; dip northerly; some dark from mica slate; others light colored. Some very large boulders, and small ones plenty enough.

M. P. A.

GLOUCESTER.

2. The proportionate amount of sickness of all kinds in this town during the year 1879, compared with previous years, has been 25 per cent. less.
3. The proportion of deaths, from all causes, in the same territory, 25 per cent. less.
4. No epidemics have prevailed during the year 1879.
5. The only endemic disease that has occurred in this circuit during the year 1879, was Typhoid Fever, in a farm house in the country. Soil sandy; house medium height; surroundings average.

6. The cause or the several causes, probably overcrowding and want of good ventilation. Water apparently good.
7. No diseases have prevailed during the year, to an unusually large extent.
8. No diseases have been attended with an unusual fatality.
9. The following zymotic diseases, viz.: Diphtheria, Hooping Cough, Measles, Scarlet Fever, and Small Pox, have not occurred in this circuit during the year.
13. Two cases only known in town of Opium eating. Dipping snuff, rather prevalent among female operatives.
14. The method of removal of excretæ, and house refuse, is by privy vaults and cess-pools, which are emptied by mixing with earth and removed in open carts by the owners.

A. POTTER.

JOHNSTON, WITH PARTS OF CRANSTON AND NORTH PROVIDENCE.

2. The proportionate amount of sickness of all kinds, in the southeasterly half of the town during the year 1879, compared with previous years, has been larger—10 per cent more sickness than 1878.
3. The proportion of deaths from all causes in the same territory, compared with previous years, has been 2 per cent. more.
4. The following epidemics have prevailed during the year 1879: Pertussis, March to July, moderate in severity; Scarlet Fever, August to December 31st, quite severe; Diphtheria, October to December 31st, mild; Measles.
5. The following diseases have seemed to have been endemic: Tonsillitis, Dyerville district—poor water; Typhoid Fever, Riverside district and Merino.
6. Cause, poor water and imperfect drainage, in part.
7. Pneumonia, Influenza and Bronchitis have prevailed to an unusual extent.
8. Pneumonia has been attended with an unusual fatality.
9. No cases of Small Pox.
12. In the locality of Riverside mills, and tenements belonging to the same, there has been considerable sickness, from impure water. Its location, in some parts is on very low land, and numerous cess-pools are exposed. The town has been notified, and some measures have been taken to abate the trouble. More attention will be necessary.
13. Quite common to find Opium eaters. Fifteen Opium and Morphine eaters known. Three Arsenic.
14. Streets are cleaned by hoe and shovel, about once a month. Where there are sewer pipes, fair drainage, although Olneyville square is often flooded on account of too small sewer pipes. Some localities have cess-pools covered, and a few privies uncovered. Town authorities are attending to latter.

G. R. FISHER.

LINCOLN AND CUMBERLAND.

1. Lonsdale, including a territory about four miles square, whose *centre* would be north and west from the village.
2. The proportionate amount of sickness of all kinds in this circuit during the year 1879, compared with previous years, is about an average.
3. The proportion of deaths from all causes in the same territory, compared with previous years, is probably twenty-five per cent. greater.
4. The epidemics that have prevailed in this section during the year 1879 are:
 1. Pertussis began in summer and is now rife in Berkeley and Ashton.
 2. Parotitis in Berkeley and Ashton; ravaged Lonsdale the year before.
 3. Varicella, now in Berkeley and Ashton; some severe cases.
 4. Diphtheria, at Scott's Pond, a small village on the Moshassuck.
5. Diphtheria would more properly occur here. Although Scott's Pond (otherwise Sayles' Bleachery) is a comparatively small place, more cases and more deaths have taken place there than in all the rest of my circuit. It may contain 1-10 of the population.
7. No diseases, not endemic or epidemic, have prevailed in the course of the year to an unusually large extent in this circuit.
8. An unusual number of sudden deaths (before arrival of physician) have occurred, *e. g.* four of adults in November and December.
9. The following zymotic diseases: Typhoid Fever and Small Pox, have not occurred in this circuit during the year.
10. There have occurred sporadically, Scarlatina—perhaps a dozen cases. Measles, early in the year, a less number.
12. The following locality in this circuit I consider peculiarly unhealthy: The stone blocks in the old village of Lonsdale—long buildings running east and west, with privies in the damp, shaded yard between, occupied by a great many persons,—forty-six families, besides a three-story boarding house also full. Drainage bad.
13. I *know* of but two cases of confirmed opium eating in adults. Infants and young children become addicted to the habit through the administration of "soothing syrup," &c. I have never known a case of arsenic eating here.
14. Cess-pools and privies are emptied almost continually by carts, one or more of them being uncovered all the time. Disinfectants are used but not thoroughly. In very few houses are the sinks trapped.

L. F. C. GARVIN.

WOONSOCKET.

2. The proportionate amount of sickness of all kinds during the year 1879, has been slightly less.

3. The proportion of deaths from all causes in the same territory, about as usual.
4. No disease has been epidemic.
5. No endemic diseases have prevailed in this circuit during the year 1879, within my personal knowledge. I have heard of some Typhoid Fever among the Canadian French, though not very numerous. There have been scattered cases of Scarlet Fever, of mild type. Very little Diphtheria.
7. No diseases have prevailed in the course of the year, to an unusually large extent. But nearly all the ordinary diseases have occurred sporadically.
8. Pneumonia has been rather more fatal than usual.
9. Small-Pox has not appeared.
12. Some of the low parts of the compact portion of the town, along the river courses, where heavy fogs prevail in spring and fall, giving rise to lung troubles and rheumatism, are the most unhealthy localities of this section.
13. Opium or Arsenic eating does not prevail in this circuit very extensively within my personal knowledge; perhaps I know of ten Opium eaters. Snuff dipping or eating is quite common among the French female mill operatives.
14. The method of scavenging the streets in the populated portions of the town is by removal by town teams. Surface drainage in cases not provided as above; no public system in use, though natural conformation of land and location of streams offer good advantages for such.

G. W. JENCKES.

CITY OF PROVIDENCE.

2. The proportionate amount of sickness of all kinds in this city during the entire year 1879, as compared with previous years, was about an average. During the first six months, although pneumonia was quite prevalent in January, the amount was somewhat less than the average for the same season; during the third quarter, considerably less than the average for that season; but during the last quarter, the general sickness was considerably larger than the average.
3. The proportion of deaths to whole number of cases of sickness, is also believed to be about the same, as in the average of previous years.
4. With the exception of Scarlet Fever, it can hardly be said that any epidemic has largely prevailed in the city. Diphtheria has been present during the entire year, but the number of cases has been less than that of several other diseases. Scarlatina has prevailed throughout the year; was one of the leading diseases during the first quarter, the cases diminishing in number until in July and August they almost disappeared, but as the

cooler weather approached, the numbers increased, until in October the disease assumed the proportions of a fearful epidemic.

5. No locality is known which conspicuously harbors or promotes any special disease.
7. Pneumonia and Bronchitis prevailed to an unusually large extent, in the earlier months of the year; Scarlet Fever, as above stated, in the last quarter, and diseases of the heart, throughout the year.
8. The diseases attended with unusual fatality in proportion to numbers, were Pneumonia, Bronchitis, and acute diseases of the heart. Scarlet Fever was not attended with an unusually large percentage of deaths, according to the opinion of a number of physicians.
9. Small-pox has not occurred during the year.
13. The consumption of Opium by private use prevails to a considerably large extent in the city, but how many in number are private consumers is simply conjectural. Arsenic is believed to be used privately to some extent; and Tobacco has an enormous consumption in many varieties of form.

The following communication may be considered under question 11.

To the State Board of Health:

GENTLEMEN:—Permit me to direct your attention to the following facts concerning an interesting group of cases recently attended by myself.

On March 25th 1879, medical advice was sought for Mabel M., aged 6½ years, and residing on the second floor of 10 Western street, second house from that on southwest corner of Jenkins and Western. She was suffering from Diptheritic Croup; the laryngeal symptoms had drawn the attention of her parents to the tonsillar. Next day, Susie C., aged 16 years, required treatment for some neuralgic trouble. She was confined to her bed in the room directly under that occupied by Mabel M. At the same time, attention was directed to the swollen face of Emma C., aged 13 years. As Mumps had recently prevailed in the neighborhood, no suspicion had been excited, but examination revealed the dreaded membrane. Her system was comparatively unaffected for she remained active throughout the attack. Since commencing this report, I have learned that she was rooming at the time with Susie.

On the 30th, the latter manifested the ordinary Diptheritic symptoms; also a sister, Marion, aged 6½ years. For convenience, she was removed to Susie's room, but after two days, the severity of her attack necessitated a second change, though only to an adjoining apartment. On April 2d, Georgie M. aged 4 years, took his place in the invalid corps, but was dismissed as convalescent one week later. Mabel M. escaped from medical supervision on the 8th. On the 11th Minnie C., aged 4½ years was added to the sick list, but Susie and Marion were stricken off next day, the latter only to be replaced on the 14th, for treatment of sequelæ. On the 17th, Fred C., aged 18½ years, followed the example of his sisters, but he required attention only five days. On May 5th, Bertha M., aged 1½

years, fell moderately ill. Croupy manifestations occurred two or three days later. I left the city Saturday evening, 10th, for the purpose of securing an entire day's rest, the little prattling seeming better conditioned than her sister Mabel had been most of the time. About noon of the 12th, I found her exhibiting the symptoms of the last stages of Membraneous Croup, and was informed the change took place about six o'clock the evening previous. Tracheotomy was suggested as the only possible relief, but the idea proved so repugnant, it was not urged. Death occurred twenty-six hours later.

Meanwhile, March 29th, Mr. K., aged 28 years, and residing on the first floor of 48 Jenkins street, northeast corner of Western, fell sick and received attention until April 8th. He was not permitted to resume the duties of his vocation, however, until five days later. His wife, aged 25, required attendance from the 21st to the 23d of April, inclusive. Finally, April 22d, Ella A., aged 24 years and residing on the first floor of 42 Jenkins street, sought medical care which was continued some five days.

The above cases are related as follows: On the 1st and 5th of March last, Dr. H, lost by Diphtheria, two young children who resided on the lower floor of 38 Jenkins street, northeast corner of Padelford. The oldest and only surviving child was first taken ill. *It is said* the others contracted the disease by stealthily seizing and using an orange that had first been sucked by the sick one. The attending physician rendered every attention that culture, devotion, and the experience of eminent counsel could suggest; but conditions dependant on the social position of the family, aggravated manifold by the idiosyncracies of a widowed mother, and a specific taint in at least one of the children, overcame all the resources of professional skill.

Mrs. C., of 10 Western street, pitied the forjorn family, and, while other neighbors studiously avoided the house, devoted all her spare time to nursing the sick children. Mabel M. was very intimate with the C.s, being down stairs quite a large part of the day. Mrs. K.'s mother, residing in her family, is a distant connection of the bereaved widow. She called two or three times a week, but never tarried long for fear of taking or communicating the disease. Mrs. A. visited the house only two or three times in all, but she remained longer.

It should be stated, parenthetically that Mrs. M., aged 28, suffered from a slight attack at the very end of December, 1878, and Georgie M., early in January, 1879; also, that a boy about seven years of age, died from this cause in November, 1877, on the second floor of 48 Jenkins street.

Concerning the sanitary condition of the homes above referred to: I found nothing at 42 or 48 Jenkins street, deserving special criticism; 10 Western street, is in my opinion, unsuited for habitation until important alterations have been made in the house and its surroundings, more especially as regards cess-pool and vault. The street is ungraded, and hence moderately uncleanly. It is always damp—generally muddy. The street water, by some means, penetrates into the cellar of this house, one-half of the basement only being cemented. The walls of this portion are frequently *very* moist. During the past season everything has been afloat upon the other side. As the water soaked gradually into the ground it may be imagined the debris did not exhale the most savory perfumes. At one time the sink water backed into the finished basement; its final disposition is the privy vault, whence rise extremely disgusting odors. Moreover, one corner of the

yard formerly bordered a marsh extending to the south and west. Traces thereof require to be eradicated. Dr. H. informed me that 38 Jenkins street was in fair condition; but from other sources I learn it is very damp, and I know the family was not particularly neat. A neighbor's yard, closely approximated, may, however, *well* be considered a rich spring for "filth disease."

Mention may here be made of Mrs. H., aged 39, and residing at 30 Mulberry, corner of Orms street, who was found seriously ill on April 8th. She had bestowed considerable attention on a child who died from this disease next door, the day previous. Also, that on September 27, 1877, I lost a young miss aged 12 years from the same cause, who resided on Congdon street, north of Jenckes, the third house, west side. Others of the children were sick about that time. In the house at the northeast corner of these two streets, there had been a number of cases of extreme severity. The premises were remarkably filthy, indoors and out. That portion of Congdon street is ungraded, and frequently is the receptacle of all manner of refuse. About that time this disease was to be found in nearly every house. The young people had been playmates.

The only general "disinfectant" employed was chloride of lime.

To avert the charge of prejudiced observation, I will remark that I do not believe Diphtheria is contagious, and I never conceal my opinion; that I am ignorant of the origination of this disease, and I never met a gentleman who could inform me; also that "Diphtheritic Sore Throat," bears the same relation to Diphtheria, that Scarlatina Benigna does to Scarlatina Maligna.

Very respectfully yours,

GEORGE B. PECK, JR.

• JAMESTOWN.

Mr. J. B. Briggs writes from Jamestown as follows:

"All parts of the town healthy through the year; do not know of but one death in 1879; man past middle age.

Know of but one person using Opium constantly.

Consider Jamestown one of the most healthy places. Drainage natural; island high in the centre; has but one swamp of any consequence; some rocky hills at south end; is strictly a farming town; is about nine miles long by an average of one mile wide; town includes Dutch Island and Gold Island.

Have lived on the island nine years; but few deaths of children in that time, and seventeen deaths of adults, as follows: One 94 years of age; four rising 80 years; six past 70 years, four past 60, and three past 50 years of age."

• PORTSMOUTH AND MIDDLETOWN.

2. Amount of general sickness for 1879, about an average with previous years.
3. Proportion of deaths rather larger.
4. In the winter and spring, large numbers were affected with catarrhal influenza.

5. No strictly endemic disease has prevailed in any district during 1879. In previous years, there has seemed to be a much more than usual tendency toward tetanus, both traumatic and idiopathic, in the vicinity of Stone Bridge, so much so as to suggest some endemic influence, not known.
7. No general disease has prevailed to an unusual extent, unless diabetes in Middletown be an exception.
8. No diseases attended with unusual fatality.
9. Diphtheria, Measles and Small-Pox absent in 1879.
10. Scarlet Fever has prevailed sporadically in Portsmouth, and Typhoid Fever in Middletown.
12. The localities peculiarly unhealthy are at the coal mines, near the north end of the island, and on the west shore, and a point nearly opposite on the east shore, in the vicinity of Newtown. The former is made up of an Irish mining population almost entirely, and the latter of an American fishing population. Each location has a river on one side, and low, wet land dividing them from the rest of the island on the other.
13. I know of but two or three who are addicted to the use of Opium.
14. There are no artificial means employed for drainage, or for the removal of excretæ and garbage, other than is ordinarily used in country localities.

LITTLE COMPTON.

2. General amount of sickness for the year, about an average.
3. Proportion of deaths, about an average.
4. No epidemic prevalent during the year.
5. Dysentery and Typhoid Fever have seemed to be endemic, and, perhaps, Erysipelas and Diphtheritic Sore Throat.
6. Know of no cause, except impure water used for drinking.
7. The following diseases have prevailed more largely than usual: Hooping Cough, Diphtheritic Sore Throat, Tonsillitis and Typhoid Pneumonia.
8. No unusual fatality.
9. No zymotic disease prevalent, except Typhoid Fever, and other diseases of intestines.
10. A few cases of Hooping Cough.
12. Doubtless the swampy lands, if the season is very wet, or very dry, are more unhealthy than other localities. There is a large proportion of swampy lands in the town.
13. Only one person known who uses Opium.

IN REPLY TO NO. 11.

Was called to attend a case of simple fever, as thought, from what the father

told me. I went and found two daughters sick, one at the point of death, the other very low. They had been attended by a physician not belonging in town, who pronounced the cases simple Fever. I immediately pronounced the cases the worst type of Typhoid Fever. In twenty-four hours the first case was dead. In twenty-one days, a family consisting of father, mother, son and four daughters were down with the fever; the son died, the father died, and the daughter before mentioned. I called in the assistance of the late lamented Samuel West, M. D., and both of us spared no pains to put the household on strict quarantine regulations, and I tested the water of the well and of the cistern; made a survey of the cellars of the house, and of the surrounding grounds, but found nothing to lead me to believe that it was local. On strict inquiry, I learned that a Portuguese traveller had been taken sick in the house, with what they thought nothing but a cold. He soon left, and finally went, as near as I could learn, to the Massachusetts General Hospital, where he had genuine Typhoid Fever, and died. This Portuguese was just landed and came right there from a Portuguese boarding-house, and was feeling this cold (as they thought) when he arrived at the house. His bed-clothes, after he left, of course, mingled with the others. No care was taken, as they knew not the danger. After weighing the case in all its details, I came to the earnest conviction that Typhoid Fever is contagious; one fact making my belief more strong, that an aunt who was with me to assist, also came down with the fever, but recovered. Other families have lived in the house since, but never a case of Fever since those.

I. B. COWEN.

TOPOGRAPHY.

(A.)

We have only one mill operated by water, and that from a pond fed by small streams from swamps, said streams running north and south. All of our brooks or small streams run in a southerly direction, and are dry, or nearly so, in the summer months. Those ponds or streams finally enter the ocean by creeks. All our largest ponds are near the beach, and only divided from the salt water by a line of gravel. We have no elevated hills, to any extent; their sides are sloping, and in the valley is found a swamp, with a brook running through it. One-half our surface is swampy land, the rest of a very heavy loam.

I don't think the wells average over seventeen feet in depth. In many instances, cess-pools and privies are very near the well, and have ordered several removed to a further distance. Our ranges of hills are north and south, mostly, but some few run east and west. The well water is generally quite hard, and the water in them is from surface drainage in a majority. We have a great deal of wood land—more wood land than open. The vegetation is very luxuriant.

I. B. C.

TIVERTON.

2. There has not been much more sickness during the past year than in previous years. I judge that it perhaps would stand in proportion of 10 to 9.
3. So far as deaths are known (for the law is poorly complied with, many dying and are buried without a legal return having been made) there has been nearly the same number, average being about forty.

4. Many cases have been reported as Diphtheria, and in my own circuit I have seen several cases of "Diphtheritic Sore Throat" which I labelled Membraneous Sore Throat, they not having the characteristic symptoms of true Diphtheria. Such cases have extended through the whole year, being two or three cases at a time; each case will have a continuance of from (3) three days to one week. One, a boy, died under treatment, or without it, probably from Membraneous Croup, as the case has been given me, although returned by the attendant as Diphtheria.

During the fall of 1878, and continuing until spring of 1879, there were around and in the village of the "Four Corners" several cases of Scarlet Fever; also, eight or ten cases on Puncateese Neck. I have been unable to ferret out their origin, but the spread of the disease was due to carelessness regarding quarantine. A few deaths resulted therefrom, although it appeared in a very mild type.

In July and August there appeared in the east part of the town a number of cases of Dysentery following one another. (5.) The disease presented a typhoid character and was quite fatal, there being about 40 per cent. deaths of those attacked. At the same time infants succumbed to Cholera Infantum. The months were very dry and many wells had failed; (6) as the soil is very sandy and apt to leach, I concluded that foul water would account for it.

7. Pneumonia, Bronchitis, Rheumatic complaints are very prevalent during cold months.
9. In the fall there were a few cases of Typhoid Fever occurring sporadically. Diphtheria and Scarlet Fever as before mentioned.
10. Typhoid Fever occurred in the family of J. N., beginning with Mrs. and followed by two children about 13 and 15 years of age (at the Bridge), also Mr. B., two miles (nearly) north, one case. Scarlet Fever in October in family of Mr. C., whose house is three-fourths surrounded by water, no neighbors except south 30 rods, or over the "cut" about 50 rods, where there is a large tenement house, the *drain* of which is about four rods long, leading on the surface to the water and uncovered, much of the time partially filled with stagnant water and other filth.
11. See 10, Typhoid Fever; also cases of Scarlet Fever before mentioned. I will refer to a case occurring in my practice in Massachusetts in 1876, fall. The family of S. D. were visited by a friend who had been where they had had the Scarlet Fever in another town. This friend had held a child for a few minutes who was at the time quite sick with the disease. In the course of a day or two she arrived at Mrs. D.'s and held one of her children. The others were about her. I do not know how long she remained in the family, but I think not over night. In due time the child became sick; then an older daughter came down, and still another within a day and a half. The second day the daughter first sick died, and the day following the other daughter died, both from malignant form of the fever. The boy passed on to Nephritis and died, and another daughter died. The oldest sister and brother came down about nine days from the first, but had it in a mild form and recovered.

A child in a family three-fourths of a mile distant, also exposed, died. No other cases to my knowledge at the time.

12. I can hardly locate it by localities. The town is not what I consider a particularly healthy one; too much wet land, causing Rheumatism and lung troubles.
13. I know of but one case of opium eating habit.
14. Drainage and scavenging only such as nature furnishes.

E. P. STIMSON.

TOPOGRAPHY.

This border town, surrounded on two sides by Massachusetts, and one side by water, presents the usual features of a coast town, except that it has no large streams crossing its territory. In the northeast, the town has on its border a large pond, South Watuppa, and connected with this by a small stream, Stony Brook, is Sarody Pond; these two ponds, with the brook, form about one-half of the eastern border, on Massachusetts, and about three-fourths mile north-west, inland from the mouth, or north end of Sarody Pond, is Stafford Pond, of about three-fourth mile in width and two and one-half miles long, running north-west from southeast. Its outlet is Eagle Brook, which has one dam in the town, forming the mill pond of the Eagle (Cotton) Mills, long since discontinued and now for sale. This brook courses to north and east, and finally reaches the Watuppa Pond, and empties into the bay by Fall River Quinque Channel, the ancient north line of the town. Further inland, a mile or more, they form Stafford Pond, and directly west, and covering several acres, is a large bog, Pocassett Cedar Swamp, quite springy, and containing a small pond, giving rise to a stream, "Sin and Flesh," or "Sinning Flesh" River. This small stream of clear and sparkling water, flows a general southwest direction, with but one dam, which forms an ice pond. It empties in Quaket Pond at "Snell's" Bridge; whole length, probably two miles. From Sarody Pond west, a mile and a half, is another extensive boggy swamp, Basket Swamp, giving rise to a brook called Crandall Brook, which runs nearly south—little east of south—and from a mile to a half mile west of Massachusetts line; is from three and one half to four miles in length, emptying, just after it leaves town, into Adamsville river (tide water), and has one dam for a grist and saw mill, one dam for a carding mill in town, and just over the line is another dam for small power; nearly the whole length of this brook is swamp land, from one-fourth to one-half mile in width.

In the centre of the town about a mile and a half long and half a mile in width, is the "Great Cedar Swamp," giving rise to Borden brook, flowing south and west, which has a saw mill, now disused, a dam which furnishes power for grist mill and wheel-wright, and then empties into tide water.

The grist mill pond, in suitable weather, furnishes ice for the inhabitants about the "Four Corners." The western border, or shore land, is quite straight from the north line down to "Bridgeport;" here a cut about one hundred feet wide allows tide water to flow a pond called "Nanna Quaket. This pond is from one-fourth mile at Bridgeport to about ten rods wide at its head, a mile and one-

fourth directly south from B. This pond receives three tributaries, viz.: Sinning Flesh, White Wine, and Quaket brooks. The two last being very small and unimportant except it be that Quaket Brook, three-fourths of a mile long and nearly its whole course, viz.: southwest, west and northwest, is bordered by wet and swampy land, near also to habitations. The peninsula formed between this pond and the bay, is called Nanna Quaket, and contains some of the best farm land in the town.

From the south line, and extending to the north, is another inlet, which is nearly closed by obstruction at its mouth, opening into the Nonquit Pond, which at its south end is about one-fourth mile wide, and increases variably in width to one-half or three-fourths mile, extending to the north about one and one-fourth miles. I think it is the recipient of two small streams: the one before mentioned and a small stream from the north of Little Compton.

The peninsula here formed is termed Puncatees Neck, and extends south; is disconnected from "Quaket" on the north by "Seapowet" Creek, an inlet from the bay.

Much of the Neck is wet, and unfit land for cultivation, while that bordering "Seapowet," is an extensive salt marsh.

(B.)

There is but one range of hills, of an elevation at the highest of about 100 feet, with *sloping* sides, with an area of about two-thirds of the town. The eastern and western descents are more abrupt, while the top is very gently sloping and contains the swamp, etc. The surface of the soil in uncultivated parts of the town is thickly covered with rocks or boulders, from one ounce to many tons weight, while in many places ledges of rock crop out. In the cultivated portions, these boulders have been in great part removed, leaving a rich soil for cultivation, consisting of sandy loam, clay, etc., with but little gravel; sub-soil, mostly clay. I should judge about two-fifths of the land is used for cultivation and three-fifths left for wood land, a good share of which has been cut off the last ten years and left to grow up again.

(C.)

Sarody Pond which borders the east part of the town, is not situated so as to affect the health of families in this State, but during the latter part of summer the edges are left bare, so that there is a malarial odor from it when the wind is easterly.

Stafford Pond has generally steep banks, and any lowering of its water does not affect the shores.

Quaket Pond is only affected by tide water. At low tides the head of the pond is left one great marsh, which in hot weather exhales the usual sea-marsh odors. The same may be said of Nonquit Pond.

I think of no water-pens near to any village which would affect the health.

(F.)

The wells are the dependence of our people for drinking-water, and are of various depths; there are no usual depths. In the east part of the town where the

sandy soil exists, the wells are apt to be dry in a dry season, if not twenty-five or more feet deep, while on the main road, most of the wells are through rock, and vary from thirty to seventy feet. Most of the water is very pure. The wells at or near Quaket Brook Swamp, have a brackish taste, especially so in warm weather; and they are also easily affected by heavy rains during a dry time. On Quaket, the depth of well is very uniform with the height of land above sea level, the bottom of the well reaching nearly to the level of high water mark.

I had hoped to furnish you with a map of the town, with the many places marked thereon, but I have been unable to procure one. Much business has prevented my finishing the report sooner. Another year and I hope to be better able to answer the many questions, as I shall be better acquainted with the different soils, etc.

We are now having a few cases of Scarlet Fever, brought from Fall River, where the people are very careless with it, and no attention seems to be paid to the law on that subject.

E. P. S

NEWPORT.—CLASS I.

2. The amount of sickness of all kinds in the city, taking the whole year together, has been less than the average of years.
4. In the spring of 1879, an epidemic of influenza, with an epidemic of conjunctivitis; no other.
5. No prevalence of endemic disease, in any locality.
7. No special sickness of large extent has occurred during the year.
8. No disease has been unusually fatal.
9. Hooping Cough, Measles and Small-Pox, have been entirely absent.
10. Diphtheria and Typhoid Fever in limited numbers, have been present. The same may be said of Scarlet Fever.
12. The localities in Newport most unhealthy are in the thickly settled portions of the city. The unhealthiness is caused by bad drainage and bad water.
14. Streets kept moderately clean, and house refuse and garbage removed by public carts. Drainage defective; sewers in some of the streets.

REPLY TO NO. 11.

During the past year comparatively few cases of Typhoid Fever and Diphtheria have taken place within the city limits. Those which came under my own observation, were in each case caused by bad drainage; and I may here state that during the past few years, I have not had a case of Typhoid Fever or Diphtheria where I have not found defective drainage in the home where the patient was first taken sick. The cases of Typhoid Fever and Diphtheria which have come under my care during the year, have been of very mild form.

During the past year, but very few cases of Scarlet Fever have taken place in Newport. Under my own care the first case occurred during the last week of

December. The contagion was brought by a nurse from Fall River. The child slept with the nurse and was taken with a malignant form of the Fever, and died after four days' sickness. Five (5) other members of the family have since been sick with the fever in a very severe form. At the same time, four (4) other members of the household have been sick with very severe sore throats, two of which have been Diphtheritic in character. The home in which the sickness has taken place is first-class. The drainage, however, has been found to be defective, and water contaminated from house drains.

REPLY TO NO. 13.

I have been able to obtain the following record of thirteen well known opium eaters, who use what is equivalent to 34,000 grains of opium a month. There are doubtless many others who obtain the drug from outside sources; and three, not included in the thirteen, have been using for years, compound prescriptions containing opium.

- (1.) A woman—has obtained from a druggist the gum opium, at the rate of half a pound a month, for over thirty years.
- (2.) A woman—obtains one ounce of gum opium a week.
- (3.) A woman—uses two (2) drachms of sulphate of morphia a week.
- (4.) Obtains eight ounces of laudanum a week.
- (5.) Obtains two ounces gum opium a month.
- (6.) Obtains two ounces laudanum a week.
- (7.) A remarkable case of a woman who has taken laudanum for twenty-five or thirty years, and for the past seven years has used *four (4) ounces of laudanum every day*.
- (8.) Obtains one-half ounce of gum opium a week.
- (9.) Obtains eight ounces laudanum a week.
- (10.) Obtains for hypodermic injection, one ounce of Magendie's sol. morphia a week.
- (11.) Obtains one quart of laudanum a month, and has used it for over thirty years.
- (12.) Obtains two ounces of Magendie's sol. morphia every five (5) days for hypodermic use.
- (13.) Obtains two ounces of gum opium a month.

In the above I have stated the quantity, and periods at which the various opium eaters procure their drug.

In a rough estimate, these thirteen opium eaters use over 34,000 grains of opium a month. Only one druggist in Newport refuses to sell opium to known opium eaters. There are no known arsenic eaters in Newport. F. H. RANKIN.

TOPOGRAPHY.

(A.)

There are no streams of water within the city limits; no dams, and no mills run by water power.

(B.)

The only hill in the city limits is one 125 feet high, in the extreme north end of

the city. The greater part of Newport is situated on an elevation of 40 to 60 feet above tide water, surrounded by water; the western slope is abrupt and rocky; the eastern, of more gradual descent. A large portion of the city is composed of country seats which are occupied only during the summer months. The ground is well and highly cultivated, and is well supplied with shade-trees, although there is no wood land. The rocks crop out largely on the western border of the city. The underlying rock in the resident portion of the city, consists largely of slate, through which runs a stratum of coal. The character of surface soil is principally loam and is very retentive of moisture; the sub-soil composed chiefly of clay, (hard-pan), with no lime, and very little gravel. Southeast of the resident portion of the city, is a large tract of rocky land of several hundred acres in extent. This is for a greater part devoid of surface soil.

(C.)

Within the city limits are three ponds. There is some bog land not in close proximity to the thickly settled portion of the city, and which, during a long dearth of rain-fall is in a very dry condition.

(D.)

There are no large valleys within the city limits.

(E.)

The resident portion of Newport consists of an elevated plateau, two and a half miles long by one-half to three-quarters of a mile broad, and from forty to sixty feet high; the highest point, however, is one hundred feet high. The general characteristic of surface soil is described in answer to question B.

(F.)

The average depth of wells in the higher portion of the city is twenty-five feet; in the lower portions, ten to fifteen feet. The water is hard, and in the thickly settled portion of the city is unfit for drinking, being highly charged with impurities of drainage matter.

Fully aware of the meagreness of this report, in reply to questions under Class II, I shall have to solicit the indulgence of the State Board of Health. During the present year a careful geological survey of Newport and its surroundings will be made for the National Board of Health, and when this is accomplished, a full report will be sent to the State Board.

Very respectfully,

F. H. RANKIN.

NORTHERN PART OF CHARLESTOWN, WESTERN PART OF RICHMOND, HOPKINTON,
AND NORTHEASTERN PART OF WESTERLY.

2. The proportionate amount of sickness in this circuit during the year 1879, does not show much difference from previous years.
3. The proportion of deaths from all causes in the same territory, compared with previous years has been less.

4. There has been an epidemic of Scarlet Fever in (Ashaway) the south-western part of Hopkinton, which continued some three months, very mild in severity. No deaths reported to my knowledge. Was confined to no locality, and was probably propagated through the school.
5. No endemic diseases have prevailed during the year 1879.
7. The diseases not epidemic that have prevailed in the course of the year to an unusually large extent are Typhoid Fever, Diphtheria and Hooping Cough.
8. No diseases have been attended with an unusual fatality.
9. Small Pox has not occurred during the year.
10. The diseases that have occurred sporadically are Diphtheria and Typhoid Fever.
12. No localities in this circuit peculiarly unhealthy.
13. The eating of Opium prevails to a small extent; can recall some six or seven persons; none of Arsenic. Am of the opinion the private use of Chloral Hydrate is on the increase.
A. B. BRIGGS.

HOPKINTON, RICHMOND AND WESTERN PART OF EXETER.

2. The proportionate amount of sickness of all kinds during the year 1879, compared with previous years, has been 25 per cent. less.
3. Many old people have died, making the number nearly an average.
4. No epidemics have prevailed.
5. No endemic diseases have prevailed in this circuit during the year 1879.
7. The diseases that have prevailed in the course of the year to an unusually large extent, are Typhoid Fever and Hooping Cough.
8. No diseases have been attended with an unusual fatality.
9. Measles and Small Pox have not occurred during the year.
10. The diseases that have occurred sporadically are Typhoid Fever and Scarlet Fever in south-west part of the town of Hopkinton.
12. No localities in this circuit peculiarly unhealthy.
13. Opium is used to some extent (very limited). I know of no arsenic eater.
14. The population is not dense enough to require any special means of scavenging.
E. P. CLARK.

SOUTH KINGSTOWN.

2. The proportionate amount of sickness of all kinds in this town during the year 1879, compared with previous years, has been less by 20 per cent.
3. The proportion of deaths from all causes in the same territory, compared with previous years, was about 20 per cent. less than the average.

4. No epidemics have prevailed in this section during the year 1879. Diphtheria and Measles have appeared in localities in limited numbers. Otherwise only the ordinary diseases of the seasons.
5. No endemic diseases have prevailed during the year 1879.
7. No diseases have prevailed in the course of the year to an unusually large extent.
8. No diseases have been attended with an unusual fatality.
9. The following zymotic diseases, viz: Typhoid Fever, Hooping Cough, Scarlet Fever, and Small Pox have not occurred during the year.
12. No localities peculiarly unhealthy.
13. A few persons, perhaps a dozen or so, use Opium or its alkaloids. No Arsenic used to my knowledge.
14. No system of scavenging practised; natural drainage good.

C. E. MARYOTT.

TOPOGRAPHY.

(A.)

The principal stream Saugatuck river, with dams and mill ponds at Peacedale and Wakefield, a side branch with dam and pond at Rocky Brook. Mills have steam power also. Saugatuck runs southerly, empties into Point Judith salt pond.

(B.)

Land rolling, hills, principally north and south in direction, east and north ledge near surface, south and west gravel, broken surface, proportion of wood land small. Tower Hill, 150 feet high, overlying a stratum of Plumbago.

(C.)

Large pond (500 acres), surrounded by swamps in west part of town, drains into Pawcatuck river. Point Judith pond south east (2000 acres.)

(D.)

No valleys, properly speaking.

(E.)

Plains not large, mostly gravel.

(F.)

Well water in some places from mill ponds and rivers; generally soft, good quality. Wells shallow on the hills, deeper on the plains, medium depth in manufacturing villages, impregnated with iron in a few places. Many cisterns in the villages.

(G.)

Principal dip of rock formation, north-east; granite.

C. E. M.

WESTERLY.

2. The proportionate amount of sickness of all kinds in this town during the year 1879, compared with previous years, was about the same as usual.
3. The proportion of deaths from all causes in the same territory, compared with previous years, was larger.
4. We have had no epidemic diseases, except in the months of February, March and April, when an Influenza prevailed, which was very general and quite severe, especially among the old and young.
5. No endemic diseases have prevailed during the year 1879.
7. No diseases have prevailed in the course of the year to an unusually large extent, unless Neuralgia be excepted.
8. No diseases have been attended with an unusual fatality.
9. Small-Pox has not occurred during the year.
10. Diphtheria, Typhoid Fever, Scarlet Fever, Hooping Cough. Generally wherever Diphtheria has occurred it has been in houses surrounded by filth either in the house or around the premises. Defective cess-pools for sink water I consider a common cause of Diphtheria in my circuit.
12. We have no localities that I consider "peculiarly unhealthy." We have healthy surroundings, a good atmosphere, and there is current enough up and down our river to keep the atmosphere constantly in motion.
13. I know of no Arsenic eating. Opium is used to some extent. I know of some six or more persons who use it constantly.
14. We have no systematic method of scavenging our streets. It is not necessary with our population, especially with the good drainage that we have. Nature and art both have combined to make our drainage good.

H. N. CRANDALL.

REPORTS FROM TOWNS

IN RELATION TO LEGAL SANITARY MEASURES.

A circular was sent, at the close of the year 1879, to the town clerks of all the towns in the State, requesting replies to several questions, and among them was the following:

“What legal measures or regulations have been adopted, or work of a public or private nature, contemplated, commenced or completed in 1879, by the consent, or under the direction of the town council of your town, or any legally authorized health officer or board of health in the town, in relation to the promotion of the public health?”

Replies were received from the following towns:

BRISTOL COUNTY.

BRISTOL.

“No new sanitary regulations have been adopted by our Town Council, since August 6, 1879, when Philip B. Bourn was appointed health officer (under an ordinance of the town), to make a thorough inspection as to the sanitary condition of the town, which was accordingly done by said officer.” P. GLADDING.

Warren and Barrington, no report.

NEWPORT COUNTY.

JAMESTOWN.

“At a meeting of the Town Council, held August 18, 1879, John B. Landers was appointed health officer, to visit all vessels on their coming to anchor within the jurisdiction of the town of Jamestown, to examine into the sanitary condition of said vessels. J. E. WATSON.

At a subsequent meeting of the Town Council the following quarantine regulations were adopted, and the duties of the health officer defined:

I. That it shall be the duty of the health officer to visit all vessels immediately, on coming to anchor within the jurisdiction of the town of Jamestown, to examine into the sanitary condition of said vessels by personal inspection or otherwise as in his judgment may seem best.

II. That in case the said health officer shall find on board any vessel, any contagious or infectious disease, or that there *has been* any such disease on board said vessel, or any vessel that has been recently in any port where any infectious disease is prevalent, he shall cause a yellow flag to be hoisted and kept constantly in the shrouds during the time the said vessel shall remain within the jurisdiction of the said town, and shall also require the commander of such vessel to give notice of the occurrence of any new case of infectious disease on board of said vessel, by such signals as the said officer may devise.

III. Said health officer shall allow no person to leave any vessel infected with a disease dangerous to life, or any vessel suspected of such infection, or go on board or visit any such vessel, without his permission.

IV. All supplies of every kind whatsoever shall be taken on board such vessel *only* by permission and under the direction of said health officer, and no articles of any kind whatsoever shall be taken out of or from such vessel to any landing place.

V. Every person who shall violate any of the regulations hereby adopted by the Town Council of the town of Jamestown, shall be deemed guilty of a misdemeanor, punishable by fine or imprisonment, in conformity with the General Statutes, and at the discretion of the court by which such offender shall be tried.

TIVERTON.

"In answer to the inquiry in relation to sanitary measures adopted by the town, I will say that no particular work has been undertaken or contemplated, as regards public health."

G. N. DURFEE.

PORTSMOUTH.

"In reply I have to say, there has been nothing new in any act of the Town Council of this town, during the year 1879, for the promotion of the public health, although there has been some talk of directing the Town Sergeant to visit some sections of the town, with that object in view."

P. B. CHASE.

CITY OF NEWPORT.

The following resolutions were passed during the year 1879, by the Board of Aldermen acting as a Board of Health.

Board of Aldermen.—July 23d, 1879.

Resolved, That until such time as suitable legislation can be procured for the creation of a separate board of health, this Board respectfully invite Dr. George Engs, Capt. Joseph P. Cotton, and Dr. Francis H. Rankin, to act with them as an advisory Board of Health, to assist them in the preparation of such rules and regulations as may be thought necessary, and to advise with them upon all matters concerning the Sanitary care of the city.

Board of Aldermen.—August 12.

Resolved, That the gentlemen appointed to advise with the Board of Health, with Aldermen Bull, Crosby and Brown, are hereby requested to consider the operation of the statutes relating to the collection and return of vital statistics in this city, and if found necessary, to suggest some method to insure a proper compliance with the laws on the part of physicians, clergymen and undertakers; and also to consider and report any desirable changes or improvements for the sanitary condition of the city in general.

Board of Aldermen.—November 4.

Ordered and Resolved, By the Board of Aldermen of the city of Newport, acting as the Board of Health in said city, on this 4th day of November, A. D. 1879: That from and after the first day of next March, no swine shall be kept within the limits of the compact part of said city, which said limits are established by the ordinance of said city, and every person violating this rule and regulation shall be fined twenty dollars for every offence.

The following ordinances in relation to the promotion of the public health were passed during the year by the City Council:

It is ordained by the City Council of the city of Newport as follows :

SECTION 1. The twelfth section of Chapter 20 of the Ordinances of the City of Newport is hereby amended by inserting therein after the word "year," the words, "nor between the hours of ten o'clock in the forenoon and five o'clock in the afternoon of any day."

SEC. 2. No person shall remove the contents of any privy vault or cess-pool nor any swill or garbage through or into any street or highway of this city in any vehicle of any description, without first obtaining a license for such vehicle from the Board of Aldermen of this city, or from some person authorized by said Board to grant such license; and every such license shall be numbered and the number thereof shall be painted in a conspicuous place on the outside of the vehicle thereby licensed, in white figures at least two inches square on a black ground.

SEC. 3. This ordinance shall take effect immediately, and every violation of it shall be punished by a fine of twenty dollars.

[Passed December 2, 1879.]

AN ORDINANCE RELATIVE TO THE REGISTRATION OF BIRTHS AND THE REPORTING OF CERTAIN DISEASES.

It is ordained by the City Council of the city of Newport as follows :

SECTION 1. Every physician shall, on the first Monday of every calendar month, deliver and leave in the City Clerk's office for the Board of Health, a record, signed by him, of every birth at which he shall have attended in said city during the last preceding calendar month; and said record shall be made out in the form prescribed in such case in Section 8 of Chapter 77 of the General Statutes of this State.

SEC. 2. Whenever a birth shall take place in said city, at which no physician shall have attended, a record thereof shall be made as aforesaid, and shall be delivered and left in the City Clerk's office as aforesaid, within one week thereafter by the father of the child so born, if the mother thereof be married and the father thereof be living, or otherwise by the mother of such child within sixty days after the birth.

SEC. 3. Printed blank forms for making said records shall be furnished at the City Clerk's office to all proper applicants therefor.

SEC. 4. Every physician shall report in writing to the Board of Health of this city, or to some member of said Board, every case attended by him of Small-Pox, Measles, Diphtheria, Scarlet Fever, Typhoid Fever, Typhus, Yellow Fever, Cholera or Cerebro-Spinal Meningitis. Said report shall be made within twenty-four hours after the physician shall have ascertained the existence of the disease to be reported, and shall contain the name, age, sex and residence of the patient.

SEC. 5. This ordinance shall go into immediate effect, and every person violating any of its provisions shall be fined not less than five dollars nor more than twenty dollars for every offence.

[Passed December 2, 1879.]

WM. G. STEVENS.

The following circular in relation to the provisions of the ordinance above reported, will explain itself:

MAYOR'S OFFICE, City of Newport.

To Physicians in Newport:

Herewith I send you a copy of an ordinance passed by the Honorable City Council, December 2d, 1879.

You will perceive that this ordinance requires reports of births to be made, also requires information to be given of the existence of cases of contagious, infectious or epidemic sickness. The want of this information has been long felt, and its importance must be obvious to all. It supplies to the Profession most valuable knowledge in regard to the ratio of deaths to cases of sickness, and gives the opportunity to take measures to prevent the spread of disease before the death of the patient.

Printed blanks and envelopes will be furnished to all physicians, so as to make as little trouble as possible in complying with the ordinance.

Physicians are requested to report *all cases of contagious, infectious or epidemic sickness existing at this date*, and hereafter, all cases as soon as known. In addition to the simple report of the case, they are requested to furnish any information in regard to the supposed causes of the disease, and evidence of contagion, or any causes of sickness about the premises that may be removed. Reports of every case are required, *even of the slightest*, as these are necessary for a correct record and statistics.

These reports may be left at the City Hall or be sent through the post office.

Please write the names plainly, give the exact age in years and months, give the residence definitely, so that it can be easily found, and give the exact date when the patient was taken sick. Additional blanks will be furnished at any time on application at the City Hall.

In addition to the diseases named in the regulations, physicians are invited to report cases of any other contagious, infectious, or epidemic diseases, including all usually called zymotic disease.

Truly yours,

J. TRUMAN BURDICK, *Mayor*.

It should be stated by the Secretary, that early in the present year, 1880, a burial and removal permit ordinance was passed by the City Council, which will effectually secure complete returns of deaths in that city. In connection with the ordinance passed Dec. 2d, 1879, in relation to returns of births, the record of the occurrence of these two classes of events must, with a proper obedience to law, be all that could reasonably be desired in regard to fullness and accuracy.

The promptness of the Mayor and other officials in the preparation and issuance of the blank forms and directions necessary to the enforcement of the ordinances respecting births and deaths, and reports of existing contagious diseases, is worthy of commendation, and doubtless reflects the public sentiment of Newport in relation to general sanitation. It is suspected the Advisory Board of Health have labored actively in the procurement of such desirable results.

No report in relation to the sanitary work of the Town Councils in the following towns, viz.: Little Compton, Middletown and New Shoreham.

KENT COUNTY.

COVENTRY.

"No new regulations, or works of a public or private character for the promotion of public health, have been adopted, commenced or contemplated."

S. W. GRIFFIN.

EAST GREENWICH.

"In answer to your communication, I would say, there has been nothing commenced or ordered by the town council of this town, having in view the promotion and protection of the public health."

E. STANHOPE.

WEST GREENWICH.

"In reply to yours of Jan. 8, I would say, that no regulations of the nature you speak of, were made during the past year by the town council of this town."

W. N. SWEET.

WARWICK.

"I know of no regulations or work contemplated, commenced or completed,

by or under the direction of this town, having in view the promotion and protection of the public health."

S. W. THORNTON.

PROVIDENCE COUNTY.

BURRILLVILLE.

In relation to the nuisance of an extensive piggery in the eastern part of the town, of which many complaints had been made, (and for which Chapter 750 of the Public Laws had in part been enacted, in order to bring the matter unavoidably before the town council), the town clerk writes as follows :

"At a meeting of the town council, held March 29, 1879, upon the consideration of a petition, it was voted 'that the farm of Nelson Armstrong, in the town of Burrillville, lying on the Providence and Springfield Railroad, be, and the same hereby is, designated as a place where swine, and animals of the hog kind, may be kept and fed on swill, offal and other decaying substances brought from said town and from other towns and cities, from now until April 1, 1880, and no longer.' No other action taken."

ALVAH MOWRY.

It has not been officially stated whether the nuisance was abated at the time designated, but such a report comes from other sources.

CRANSTON.

"Our town council passed ordinances in 1879, to prevent persons from bringing into the town the contents of privy vaults and other offensive matter, for the purpose of depositing the same, a practice that had become quite common; those were the only sanitary regulations made during the year 1879."

J. M. WHEELER.

CUMBERLAND.

"The town council of this town did not in the year 1879 pass any new regulations in regard to the protection of the public health."

H. A. FOLLETT.

FOSTER.

No action of the Town Council of this town during the year 1879 in relation to nuisances or having direct relation to the promotion of public health, has been reported. But the Town Clerk, by order of the Council, prepared an excellent synopsis of the General Statutes in relation to the returns of births, marriages and deaths, which was printed on sheets fourteen by seventeen inches in dimensions, and posted in conspicuous places in all sections of the town. The Town Councils of all towns where burial permits are not required, would render essential service to effective registration by a similar order. It is particularly desirable that all persons should be informed of the

fact that they render themselves liable to a fine of twenty dollars, for neglect to make a return of the death of any person whose funeral they conduct, or whose burial they assist in.

GLOCESTER.

"No action by the town council in view of the promotion or protection of public health."
C. W. FARNUM.

NORTH SMITHFIELD.

"In regard to the inquiry as to what action the town council of this town has taken, during the year 1879, in relation to the promotion of the public health, I would say that the council resolved to constitute themselves an active board of health for all needed purposes. Mr. John H. Higgins, president of the council, is superintendent of the mills in the village of Forestdale, and is very particular to have every thing about the village kept neat and in a healthful condition. Each of the members of the council took it upon himself to look after his part of the town, and see that every thing was done to prevent the spread of any contagious diseases."
A. HOLMAN.

PAWTUCKET.

"In reply to your note of inquiry, would say that no action has been taken by the town council of this town in relation to public health during the past year."
L. PEARCE.

SMITHFIELD.

"In reply to yours of 8th January, I would say that no action whatever, of the nature indicated, was taken by the town council during the past year."
O. A. TOBEY.

WOONSOCKET.

"Yours of 8th inst. received. In reply I have to say that the town council of this town have not made any new regulations, during the year 1879, having in view the promotion or protection of the public health."
A. E. GREENE.

CITY OF PROVIDENCE.

The following are the only *new* acts or regulations adopted during the year 1879:

CONCERNING STREETS.

(July 17.)

"Ordered that no street or portion of any street in the city shall be watered, unless the decomposing filth in such street or portion of such street shall be first thoroughly removed."

"Ordered that any person who shall violate the provision of the above regulation, shall pay a fine of not less than one dollar nor more than ten dollars for each offence, on complaint brought by the Chief of Police."

REGULATIONS.

Providing for obtaining Reports of Cases of Contagious, Infectious, or Epidemic Sickness.

(Adopted December 26, 1879.)

1. Every physician having knowledge of the existence of any case of contagious, infectious, or epidemic disease within the city of Providence, shall immediately make a report thereof in writing, to the superintendent of health of said city, with such particulars as the said superintendent may indicate on blanks furnished for that purpose.

2. The diseases referred to in the preceding section, shall, among others, include especially small pox, diphtheria, typhoid fever, typhus fever, scarlet fever or scarlatina, cerebro-spinal meningitis or spotted fever, measles, and whooping cough.

3. Any physician who shall fail to comply with the preceding regulations, shall be fined not less than two dollars nor more than ten dollars for each day of such neglect, after having knowledge thereof as aforesaid.

In addition to the above, the following circular was issued:

OFFICE OF THE SUPERINTENDENT OF HEALTH.

To Physicians in Providence:

Enclosed, I send a copy of regulations adopted by the board of aldermen, December 26th, 1879.

You will perceive that these regulations provide for obtaining information of the existence of cases of contagious, infectious or epidemic sickness. The want of this information has been long felt, and its importance must be obvious to all. It supplies to the profession most valuable knowledge in regard to the ratio of deaths to cases of sickness, and gives the health officer an opportunity to take measures to prevent the spread of disease before the death of the patient.

Blanks printed on postal cards will be furnished to all physicians, and also other blanks on half sheets of note paper, and envelopes directed to me, so as to make as little trouble as possible in complying with the regulations.

Physicians are requested to report *all cases of contagious, infectious, or epidemic sickness existing at this date*, and hereafter, all cases as soon as known. In addition to the simple report of the case, physicians are requested to furnish any information in regard to the supposed causes of the disease, any evidence of contagion, or any causes of sickness about the premises that may be removed. If anything more than the simple report of the case is made, the blanks on note paper may be used. Reports of every case are required, *even of the slightest*, as these are necessary for a correct record and statistics.

These reports may be left at *my office in the City Hall, or be sent through the post office, or be left at the nearest police station, or be given to any police officer.*

Please write the names plainly, give the exact age in years and months, give the residence definitely, so that it can be easily found, and give the exact date when the patient was taken sick. Additional postal cards and blanks will be furnished at any time on application to my office, or by mail.

In addition to the diseases named in the regulations, physicians are invited to report cases of any other contagious, infectious, or epidemic diseases, including all usually called zymotic diseases.

Truly yours,

EDWIN M. SNOW,
Supt. of Health

No reports from East Providence, Johnston, Lincoln, North Providence and Scituate.

WASHINGTON COUNTY.

EXETER.

"The town council of Exeter has not taken any action, or made any regulations, with reference to the public health, or sanitary condition of the town, or any part thereof, during the year 1879."

N. B. LEWIS.

HOPKINTON.

"No ordinances or regulations of the kind indicated have been adopted or passed by the town council of this town."

E. R. ALLEN.

NORTH KINGSTOWN.

"In reply to yours of a late date, I would say that there has been nothing done by the town council of North Kingstown in regard to the sanitary condition of this town. In fact, it does not appear that any thing needs to be done. If you have any suggestions to make in regard to sanitary measures and will do so, I will lay the matter before them."

J. B. PIERCE.

SOUTH KINGSTOWN.

"There was no regulation adopted, or work of a public or private nature contemplated, commenced or completed, in 1879, by or under direction of our town council, in relation to public health. If it is desirable that something should be done in this matter, please inform me what, and I will do what I can to set it going."

J. G. PERRY.

No reports from Charlestown, Richmond and Westerly.

CATTLE COMMISSION.

This department of the work of the State Board of Health, has during the entire year, demanded a great deal of time and attention. It has been the design of the Secretary, to allow no report of any suspected disease, possibly contagious, or affecting any considerable number of animals, to be received without giving it immediate attention.

The work, however, has been mainly in the direction of the discovery and disposal of glandered horses. A recital of the difficulties encountered in ascertaining the places of concealment or ownership of some horses suspected of having the disease, whose owners, upon the first suspicion on their own part, of the nature of the disease, or the fear, or knowledge of the fact, that the case would be, or had been reported to the Secretary, had removed them to other places, or disposed of them to other parties, would be amusing to persons unacquainted with the perplexities of the search.

The various devices by which a clue is obtained and followed up, and others reached until the final discovery, are such as might be employed in the detection and arrest of criminals.

No instance is now remembered, in which an animal reported to the Secretary as suspected, has not finally been traced out and effectually disposed of, for it has so happened that in every case where concealment has been attempted by frequent sales or removals, that the disease has been evident on first inspection, and condemnation was the only alternative. In one instance, a horse was traced from Providence through several towns in a zigzag route, not remaining more than a few days in a place, into another State, and finally into Washington county, where it was found and destroyed. The horses that are so transferred from place to place, and from one owner to another, in the city or the country, (and it is in the country towns where they can be kept longest without detection) are almost always such as have been bought and sold for less than fifty dollars, and much more frequently for less than twenty-five.

The owners of such horses are usually parties whose means are quite limited, and who feel indisposed to meet any or at least much loss on them, and so, upon the first intimation of disease, dispose of them as soon as possible. By means which would be suggested to any common person, the most obvious symptoms of the disease can be arrested or concealed for a few hours, and this circumstance affords an occasion for disposal, which is taken advantage of the first opportunity. Some of the horses which have been condemned could be traced through various selling prices by different owners in a few weeks, from forty or fifty dollars down to five or ten.

These are the horses which endanger the public most. They are in the hands of unscrupulous owners, who have no regard for the rights or property of others. Such diseased horses are more frequently brought into contact with the horses of unsuspecting persons, on the street, at the watering troughs, the feeding troughs, or in the transient feeding stables. By such means the disease may be indefinitely perpetuated.

It is believed that if the owners of such horses could realize some considerable part of the price paid for them, they would quite frequently report for themselves, and voluntarily relinquish possession. In such case the animal would sooner cease to infect others, and the cases would more rapidly lessen in number. With this view, the Secretary would recommend an appropriation by the General Assembly, for the purpose of paying some part of the cost price, to the owner of any horse condemned to be destroyed by competent authority, on account of glanders, said payments to be made under proper checks and restrictions.

The expenses would probably amount to five hundred or six hundred dollars for the first year, and then gradually lessen until the disease had ceased to have any formidable proportions.

The expenses would doubtless be much less for a term of five years, than by the present method.

It has been the rule of the Secretary to visit every animal reported at the office as suspected of having glanders or farcy, either by himself or some other competent person (without additional expense to the State), who was invested with the necessary authority under the official seal.

Of the cases of *suspected* glanders, reported and visited in 1879, not more than one in six has been found affected with that disease.

About one hundred suspected horses have been reported and visited

during the year, by the Secretary or his assistants, in whom no evidence of glanders or farcy was found.

The large number of suspected animals reported, is evidence of a wholesome feeling of apprehension in the communities, and among horse owners a reasonable fear that their own animals may contract the disease, and that they are therefore watchful, in observing any appearance indicating the disease either in their own horses or in those possession of other parties.

In order to assist intelligent persons in detecting the disease, the Secretary was requested by vote of the Board at a meeting held in April, "to prepare a brief statement of the most apparent or obvious symptoms of the disease called glanders or farcy, in style for popular comprehension, and for the purpose of general distribution in the form of circulars or tracts."

The statement was prepared accordingly, and upon approval by the Board, five thousand copies were published; the tract containing in addition, the REGULATIONS adopted by the board in relation to contagious diseases among domestic animals, together with references to the General Statutes, where provision is made and authority conferred for the enforcement of the same.

In form it was as follows:

[FROM THE OFFICE OF THE R. I. STATE BOARD OF HEALTH.]

GLANDERS AND FARCY.

PUBLIC HEALTH TRACT No. 3.

POWERS OF THE STATE BOARD OF HEALTH IN RELATION TO CONTAGIOUS DISEASES AMONG DOMESTIC ANIMALS.

By act of the General Assembly, the Board is required to perform all the duties which had been delegated to the Board of Cattle Commissioners, in Chapter 76 of the General Statutes. The law provides in Section 8, of said Chapter 76, that: "The Board may make all necessary regulations for the *prevention*, treatment, cure and *extirpation* of such diseases, (contagious and dangerous to life,) and every person who shall fail to comply with any regulation by them so made, shall be fined, not more than three hundred dollars, or be imprisoned, not more than one year."

Another section provides that: "If any person shall sell or offer to sell any domestic animal, known to him to be infected with any contagious disease, dangerous to the public health, he shall be fined, not more than one thousand dollars, or be imprisoned not more than two years, or both at the discretion of the court.

In furtherance of the said objects, the State Board of Health have adopted the following regulations in regard to contagious diseases among domestic animals :

1. No person having the care or ownership of any horse or other animal, having the disease called glanders, or any other disease highly contagious and dangerous to life, shall sell or offer for sale, or permit any such animal to go into or be in any public lane or highway, or expose or keep any such animal within the same building, or within fifty feet of any other animal not so infected.

2. Any person having knowledge of any disease or any facts as set forth in the preceding section, shall report the same to some member of the State Board of Health immediately.

3. No horse declared by competent authority to be affected with glanders or farcy, shall hereafter be allowed to be kept for experiment.

DAVID KING, *Chairman*.

CHAS H. FISHER, *Sec'y*.

GLANDERS AND FARCY.

The continued prevalence of glanders and farcy, (which are two terms for one disease), in some sections of the State, is owing, in a great measure to the want of a general knowledge of the symptoms of the disease, by which it may be detected, before a large number of healthy animals are exposed to infection. It will be the design of this tract to present the most prominent and characteristic symptoms of the disease, in such manner as will enable those who may come in contact with infected animals to more easily detect the disease in question, and aid in its possible complete extirpation.

Like other diseases, glanders varies greatly in different animals, in regard to severity and rapidity of progress.

The general forms in which it appears are the acute and chronic.

ACUTE GLANDERS

is that form in which the disease takes on a peculiar malignancy, and rapidly becomes fatal. Many of the symptoms, however, are present in that stage of *chronic* glanders which terminates the disease and the life of the animal.

The acute form is characterized by high fever, loss of appetite, thirst, shrinking of the flesh, skin dry, hair standing out pointing away from the body, the temperature of the mouth or rectum rising from 104° to 109° F. Trembling and shivering also are present, dependent in frequency and degree on the severity of the disease. The urine is usually very much increased in quantity, is clear and thin, the breathing which runs up to forty, and sometimes even to sixty respirations per minute, is hard and labored, the pulse is quick and weak, while the heart can be felt and heard beating strong and loud. The lining membrane of the mouth has a saffron redness, and that of the nostrils is crowded with dark colored blood, and sometimes thickened by swelling.

After three or four days the fever begins to subside, and then there appear, in patches, spread in scattered spots over the lining of the nostrils, little pimples, from the size of pearl barley to a pea, having a bright red border, and a light colored spot in the centre. These pimples ulcerate, and within forty-eight hours leave a depression or pit, with ragged edges, about one-eighth of an inch deep, and with granulations, like what is called "proud flesh," at the bottom.

These pits grow wider gradually, or run together until they cover almost the entire surface of the nostrils, in one continuous ulcerating sore, having a preference, however to the partition of the nostrils, which may be in rare instances perforated through and through. A greenish hue of the diseased surface, will indicate when mortification and perforation is taking place.

At the time of the appearance of the pimples, there will also be a copious discharge from the nostrils, of a thin, yellowish, sticky fluid, not unlike that which occurs in catarrh from taking cold. This discharge gradually becomes thick, varying in color, sometimes streaked with blood, and having the characteristics of matter from an abscess. The quantity is increased rather than diminished.

At this time, also, the glands of the lower jaw become swollen, and somewhat painful, especially from pressure. At first pliable and soft, they soon become hard, rigid and immovable. The inflammation of the nostrils extending to the throat and windpipe, occasions a dry, short, harsh cough, apparently painful and often harassing.

Pustules or pimples sometimes appear in the windpipe, and greatly increase the difficulty of breathing and the cough.

In some cases the joints swell and become very sore and painful. "Farcy buds," so called, which are small tumors varying in size from that of a pea to a walnut, appear in or beneath the skin in various parts of the body, but more particularly where the skin is thinnest, as on the inside of the thighs and legs, beneath the abdomen, and around the face. These ulcerate, sooner or later, and add to the distress of the animal already overburdened with suffering.

The lungs frequently become inflamed, deposits of glanderous matter resembling tubercles occur in them, which cause ulceration, increase the difficulty of breathing, and hasten the fatal result. Death occurs in from five to twenty days, according to the severity of the disease, and is usually preceded for a day or two by a return of the fever which ushered in the disease and then temporarily subsided.

CHRONIC GLANDERS.

The first notice of the presence of chronic glanders is usually a continuous discharge from one or both nostrils. There is a form of the disease, however, called "dry glanders," in which the discharge is very slight, and, therefore, unnoticeable; but the cases are exceedingly infrequent. At the commencement, the discharge is thin and clear, but later the transparency entirely disappears, it becomes heavier and more tenacious, crusting within and just outside the rim of the nose, and dripping slowly, or blown in thickened masses from the nostrils. The discharge is at first small in quantity; but becomes more abundant as the disease progresses. The crusts that form around the nostrils, and upon the lips, have a soft, oily feeling when pressed by the finger, but notwithstanding the greasy feeling will usually adhere to any substance with which they come in contact. These crusty accumulations have a dark brown or mahogany color. After an indefinite period of time, depending on the severity of the disease, the discharges assume the appearance of pus, or matter from a running sore. If the disease is to take on a rapid progress, the discharges appear like those in acute glanders, becoming thicker, bronzy in color, and sometimes streaked with blood. This is owing to more rapid extension of the ulceration in the cavities of the nostrils. When the disease progresses more slowly, the discharges are of a light green tint, and continue of that color, until more rapid ulceration or the last stages of the malady occur.

The discharges from the nostrils are not always offensive on account of an inherent fetid smell; the disagreeable odor noticed, in most cases, arising from a retention of the matter, and its natural putrefaction in contact with the air and the breath of the animal.

At the commencement of the disease, if the fore-finger be made to sweep around the internal surface of the nostril, there will be felt little protuberances, as though shot were imbedded in the lining membrane. Or if the rim of the nose be turned over the thumb or finger, there will be seen little oval, or roundish elevations on the surface of the lining membrane, about the size of an ordinary pepper corn, and of a deep straw color, while the lining membrane just around them is whitish and glistening as if polished. In the acute form of the disease, the membrane that borders the pustule is of a bright red.

These ulcerate in a few days, a small quantity of matter is discharged, and a pit is formed as in acute glanders.

These pits, which are usually not more than a half dozen in number, do not spread by surface ulceration *so rapidly* as in the acute form of the disease, and instead of being of a bright red color, are nearer the color of rough slate or sheet lead. The edges also are harder and form an elevated rim around the pit, and the surrounding tissues and base of the pit are hard and gristly.

These ulcerating sores are frequently alluded to under the term of "glander chancres," having a resemblance in their first stages to the chancres of syphilis. They increase in diameter slowly, but steadily and surely, and when there are several in near proximity, they often run together, as in acute glanders, and form one large ulceration, having, however, the same hardened outer border.

In some rare instances, and under very favorable circumstances, the chancres heal, leaving white, circular scars in place of the pits. Such an occurrence should not be regarded as evidence of the extirpation of the disease, but simply an effort of the system to repair its losses, assisted by rest, nourishing diet and the best of attention in every way. The healing of the chancres may go on also, while the disease is active elsewhere, as in the deposition or development of glanderous tubercles in the lungs. But the glander chancres will appear again in the nostrils, and continue on to destructive ulceration.

After a variable length of time the glands beneath and between the jaws become enlarged. If the chancres are present upon or within but one side of the nostrils, the glands are usually swollen only on the same side.

The enlargements vary from the size of a filbert to that of a middling sized peach. For a week or two after the glands become swollen, they are tender upon pressure, and feel like putty enclosed in a thick woolen cloth. They then gradually acquire a firm, stony feeling, uneven over the surface, become bound to the parts around them, and frequently immovably fixed to the jaw bone and skin. These glandular swellings never become running sores.

Many horses are not suspected of having glanders, until attention is called to their condition by some disability, as, for instance, swelling of the joints and fleshy parts of the legs with consequent lameness, general weakness, hurried breathing, nose-bleed, persistent cough, loss of flesh, &c.

And cases occasionally occur in which none of the outward symptoms of glanders appear, the disease being located wholly in the internal organs, as the lungs, liver, spleen, and glands of the bowels.

FARCY.

This term simply distinguishes a form of glanders in which there is a local development of the disease in the form of tumors in and beneath the skin. These appear more or less rapidly one after another according to the severity of the general disease, and vary in size from that of a pea to that of a walnut. They ulcerate sooner or later, and become eating and spreading sores, with ragged borders, and surrounded by hardened ridges of flesh, with a marked depression in the centre, from which large quantities of matter are discharged.

FARCY CORDS.

After farcy buds appear, there also may be seen long, straight, narrow ridges, as though a small rope lay beneath the skin. These farcy cords, as they are called, always run from a farcy bud to the nearest lymphatic gland, and are the lymphatic ducts or pipes, inflamed by the glanderous poison. They often become chains of farcy buds which develop in them, and which in turn ulcerate, and pursue the same course as the original farcy buds.

DISINFECTION.

Every stall or enclosure where a horse having glanders or farcy has stood, should be thoroughly disinfected, after the removal of the diseased animal.

Care should be taken that the hands be not inoculated by the virus contained in the matter left upon and in the manger, and upon the sides of the stall and on the floor. It is better that the hand should not come in contact with any part of the stall but that a short mop be used for washing.

There are many modes of cleansing and disinfecting, and many kinds of disinfecting agents that can be made use of. The most effectual agent is heat above 200° F. Tearing out and burning the wood work of a stall, and subjecting the iron work to the heat of burning wood, takes precedence of all other methods for absolute effectiveness. All the articles made use of upon and about the horse, like brushes, blankets, brooms, &c., should be destroyed by fire. Larger and better articles may be boiled for half an hour, when the form or texture will allow, or subjected to dry heat of an equal tem-

perature. If the stall is to be retained, the whole surface of every part should be thoroughly rubbed and scrubbed, with boiling water, by means of a mop with a short handle, for greater facility of use. The boiling water should be pressed into all the cracks and crevices, and used so freely that all the slimy and sticky matter will be dissolved and cooked in it.

Another method is to use copperas dissolved in boiling water. Three pounds to a pail full of water in which is also dissolved one-half pound of crude carbolic acid; or the copperas is quite effectual alone, but in either case the liquid should be used hot and in the same manner as the boiling water.

It is unnecessary to go into details respecting other modes of disinfecting, as the above are the cheapest, most easily performed, and sufficiently effective for all ordinary cases.

Lime washing should, however, as a last application to the entire surfaces of the stalls, follow either of the above methods.

Copies of the tract were left in parcels for gratuitous distribution, in a number of places of large resort, in the cities of Providence and Newport, and in the larger villages of Providence, Kent and other counties. They were also distributed in nearly every public stable, and blacksmith shop in the city of Providence and vicinity.

INSPECTION OF STABLES.

By vote of the Board, "the secretary was authorized, if he deemed it expedient, to cause an inspection to be made of any, or all of the public or private stables of the city of Providence, and vicinity."

The occurrence of several cases of glanders, brought to the notice of the Secretary, within the period of a few days during the second week in August, seemed to demand some action which should determine as far as possible, to what extent the disease was prevailing in the city, and vicinity.

The services of Constable C. H. Thurber, who has had a large experience with glandered horses, were secured.

It was not thought expedient to visit those larger stables which are under the constant supervision of a veterinary surgeon, nor the private stables of those who keep only first-class horses, and who call in the services of skilled veterinarians, upon the occurrence of any disease among their animals.

The instructions given the inspector were, that while stables of the character described in the preceding paragraph needed no attention, he should take especial pains to seek out and examine all stables and places where the disease would be more likely to gain access, or be harbored and perpetuated.

He was furnished with a blank book, in which he was to make a record of his work, giving the day of the week and month of the visit made, the location of the stables visited, the name of the owner or owners, the number of horses examined in each one, the general condition of the horses, the sanitary condition of the stable and surroundings.

The following report was received from Mr. Thurber upon the completion of his work.

PROVIDENCE, Oct. 27, 1879.

Charles H. Fisher, M. D., Secretary of the State Board of Health:

SIR:—In accordance with your instructions I have made as thorough an examination, as circumstances would permit, of the sanitary condition of the horses, stables and barns within the city, having special reference to the disease called Glanders and Farcy, and submit the following report, to wit:

Horses examined in stables.....	1578
Stables and barns visited.....	328
Horses found glandered or farcied, or both, and destroyed.....	6
Horses suspected to have the disease, isolated, and since discharged.....	8
Horses at present isolated.....	2
Barns in bad sanitary condition.....	33

Also not included in the above statement I have made daily examinations of team and hack horses found at the railroad station, and on the streets, and the horses of marketmen and others found standing on the bridges to the number of not less than five hundred additional.

Respectfully,

CHARLES H. THURBER.

The book of record is in the office of the Board, and can be seen by any person desiring an examination.

HOSPITAL FOR DISEASED HORSES.

At one of the meetings of the Board, a committee was appointed "to take into consideration the expediency of establishing a hospital for such diseased horses as were suspected of having glanders or

farcy," such horses to be retained and treated until further development should declare the nature of the disease.

While such an institution would undoubtedly be of considerable value in removing from the public, animals having the disease sufficiently advanced to communicate it, and therefore liable to infect other animals, if left in charge of persons not known to be careful and reliable, there are at the same time other considerations which, in the judgment of the committee, seemed to make the establishment of such an institution unadvisable at present.

PUBLIC WATERING TROUGHS.

Considerable complaint having been made to the Secretary, of the dangers apprehended of the infection of glanders being communicated to sound horses through the medium of the horse watering troughs in the city of Providence, it was resolved by the Board "to recommend to the Mayor and Board of Aldermen of the city of Providence, the consideration of the propriety of thoroughly cleansing and drawing off the water, *daily*, from the public horse watering places, as a means of diminishing the liability to infection from glandered horses having access to them."

This resolution was communicated to the Mayor, from whom the following reply was immediately received:

CITY OF PROVIDENCE, EXECUTIVE DEPARTMENT, }
CITY HALL, August 22d, 1879. }

Hon. C. H. FISHER, M. D., Secretary, etc.

Dear Sir:—I have received the copy of the vote of the State Board of Health in relation to the cleansing of the public drinking troughs, and have transmitted the same to the board of water commissioners who will cause the work to be done.

Yours truly,

THOS. A. DOYLE, *Mayor*.

It is believed that a continuance of the practice of frequent cleansing of the drinking troughs as above described, would aid very materially in diminishing the number of glandered horses.

DETECTION OF GLANDERED HORSES.

The Secretary has had the aid during the year, as heretofore, of Dr. N. A. Fisher, General Agent of the Society for the Prevention of

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Cruelty to Animals, whose attention to cases of disability or unfitness for labor of horses, by reason of age or disease, has brought him not unfrequently in contact with glanders. His services have been highly appreciated. The police of the city of Providence have also been quite prompt in the reporting of suspected cases, and Constable C. H. Thurber, local agent of the Society for the Prevention of Cruelty to Animals, already spoken of, has also rendered valuable service. The means of detection in the country towns and larger villages, are in the hands of persons who can render better service by having their names withheld.

As before stated, a very much larger number of suspected cases of glanders are reported, that are found free from that disease, than are affected with it, and much the largest proportion of the informers of such cases are persons outside of any agency employed.

DEATH RETURNS.

In order that a more correct and fuller record of the circumstances attending all the cases of death and burial of glandered horses might be kept, the Secretary prepared a "Return" which is designed to be filled out by the person who has charge of the burial of any such horse, and especially of any burial at the expense of the State. The returns have been made in all such cases, and may be examined by any person desiring to do so.

The Return is as follows : (See blank on the next page.)

RETURN OF DEATH OF HORSE,

AFFECTED WITH GLANDERS OR FARCY.

STATE OF RHODE ISLAND.

- | | |
|---------------------------------------|------------|
| 1. Date of death ?..... |1879. |
| 2. Died of disease ? or killed ?..... | ..... |
| 3. Place of death?..... | ..... |
| 4. Date of burial?..... |1879. |
| 5. Place of burial?..... | ..... |
| 6. Form of disease ?..... | ..... |
| 7. Duration of disease ?..... | ..... |
| 8. Color and Sex?..... | ..... |
| 9. Probable age? and condition?..... | ..... |
| 10. Name of owner?..... | ..... |
| 11. Place where kept?..... | ..... |
| 12. Stable public or private?..... | ..... |
| 13. By whom reported?..... | ..... |
| 14. By whom brought or taken?..... | ..... |
| 15. By whom buried?..... | ..... |
| 16. Buried at whose expense?..... | ..... |

.....INFORMANT.

DISPOSAL OF GLANDERED HORSES.

As in previous years persons having in possession horses affected with glanders, are frequently of impecunious means, and quite as often have too little feeling of responsibility, and are too indifferent to the welfare of the public, to take the animal to a proper place for burial, and perform that work in a proper manner. Therefore the arrangements heretofore made with Mr. W. E. Barnes, of Field's Point, for that purpose, have been continued, and his returns have been quite promptly sent in, and can at any time be inspected.

The number of cases of glanders, which have come to the knowledge of the Secretary, and been disposed of in this State, during the year 1879, is forty, of which thirty-three were buried by Mr. W. E. Barnes, and seven elsewhere and in different towns.

During the year 1878, there were in the eight months following the organization of the Board, twenty-five horses affected with glanders, which had died or been killed within the knowledge, or by the order of the Board or its agents. Previous to the organization of the Board, and in the same year there were eighteen which had come under the notice of Dr. N. A. Fisher, making forty-three in all.

It is not too much to say that the means of discovery of cases of this disease have been more complete during the past year than at any previous time.

The advent of any considerable number of horses into the State at any time, (with the exception of young horses brought in for sale,) is the occasion for an examination by a veterinary expert, and on one occasion during the year 1879, three horses were found glandered in a circus troupe by Dr. N. A. Fisher and Constable Thurber.

The following communication from Dr. N. A. Fisher, whose services have been previously alluded to, will sufficiently explain itself :

R. I. SOCIETY FOR THE PREVENTION OF CRUELTY TO ANIMALS,
PROVIDENCE, January 3d, 1880.

Charles H. Fisher, M. D., Secretary State Board of Health.

SIR:—The following report includes all the cases of Glanders and Farcy that have come to the personal knowledge of the agents of this society during the past year, and all that have been reported to the State Board of Health, and as it is believed that the regulations of the Board, making it the duty of any person having knowledge of animals having this disease, to give prompt notice of the same to some member of the Board, has been generally complied with, it may be regarded as nearly correct.

The whole number of cases of Glanders and Farcy found in the State in the year ending January 1st, 1880, is forty, which is three less than in 1878, and seventy less than in 1877. Of these forty—all of which were horses—two died of the disease and thirty-eight were killed, six by their owners and thirty-two by direction of the Board. Thirty were found in the city, three in Johnston, two in Cranston, one in Scituate, one in East Providence, one in Lincoln and one in Pawtucket. Of those found in the city, six were in public stables, nineteen in private stables, three at the Saturday sales of old horses on the Cove lands, one of which was brought from Connecticut, and one from Massachusetts, and three were found with Bachellor & Doris' circus, which came into the State in July.

Numerous cases of animals suspected of having Glanders or Farcy have been examined, but the greater part were only catarrhal affections, which have been somewhat prevalent. Wherever there was any doubt about the nature of the disease, careful isolation was insisted on until all doubt was removed; and if the result proved that the suspicions were well founded, the animals were destroyed.

The judicious measures adopted by the State Board of Health have undoubtedly done much to prevent the spreading of the disease, and give assurance that the danger which has been so alarming will soon be entirely averted.

N. A. FISHER,

General Agent R. I. Society for the Prevention of Cruelty to Animals.

PLEURO-PNEUMONIA.

This is one of the most fatal of contagious diseases among cattle, and also one of the most to be dreaded, because of the rapidity of the communication of the disease from one animal to another. It may indeed be said to be more rapidly destructive of large numbers of cattle than any other, unless with the possible exception of the rinderpest or cattle plague.

During the year notices have been received from three localities in the State, where the disease was believed to prevail in limited numbers.

In neither instance was there any foundation for a reasonable conjecture even, that the disease was pleuro-pneumonia, had the parties any fair knowledge of the nature and characteristics of the disease.

It may be stated here, that the disease *never* occurs spontaneously, that *every case* is the result of contagion; an infection communicated from a previously diseased animal, and that it never occurs singly or in twos or threes only, where there are any other animals of the same kind to be affected.

Early in the year it prevailed largely in Brooklyn, N. Y., and vicinity, and many persons in Rhode Island became alarmed when any form of disease occurred among cattle, which seemed at all unusual.

In the month of March, a communication was received from Mayor Doyle, of Providence, in which it was stated "that he had been informed that there were and had been for some time in the city and vicinity, sick cows, the milk from which had been sold and used in the city with the knowledge of the State Board of Health." It was true a rumor had been circulated, that pleuro-pneumonia had broken out in two of the milk stables of some magnitude in the south part of the city. Sensational articles had appeared in some of the newspapers in relation to the diseased animals.

An examination was made by the Secretary, immediately upon the receipt of the first notice of suspected disease among the cows in those stables, without finding any evidence of disease of any kind whatever. Milk from different cows in both stables was taken, and by request of the Secretary subjected to analysis by the Milk Inspector of Providence, with the result of finding no abnormal constituents.

This disease is not likely to be brought into the State by western cattle, as it has never prevailed west of the Alleghanies.

The danger has been, and doubtless will continue to be from *blooded stock* brought from Europe or New York, or some one of the tier of Atlantic States, between New York and North Carolina.

The disease can never gain large headway in Rhode Island, with anything like timely notice having been given the State Board of Health.

During the year the Secretary has visited a considerable number of the larger milk stables of the city of Providence and vicinity, for the purpose of ascertaining what were the sources of diseased milk, if any such sources existed.

The result was a firm conviction that the stables from which the city of Providence is supplied with milk, are at least in regard to general condition and healthfulness of stock, equal to those supplying any city in the United States.

No reports of the supposed existence of any other contagious disease among the domestic animals of the State have been made, although not a few persons have made the inquiry, whether the spinal meningitis affecting a considerable number of horses throughout the State, was not contagious? and a fear has also been expressed that the Gourme or Horse-Pox, prevalent in some parts of Canada during the year, would be transmitted to Rhode Island. There is no evidence that the spinal disease is contagious, and the Gourme is not a disease of a character dangerous to life, but will have early attention if it becomes known in this locality.

EXPENSES OF THE BOARD.

Paper and printing death returns, circulars, etc.....	\$66 51
Books, twine, wrappings, stationery, etc.....	50 30
Postage stamps and postal cards.....	53 00
Expressage and telegrams.....	4 22
Electrotype plates, maps, etc., first annual report.....	30 00
Heating apparatus, fuel, cleaning, etc ..	30 60
Binding returns of births, wrappings, etc.....	14 40
Traveling expenses of members....	81 00
Copies of Sanitarian for correspondents.....	39 75
	<hr style="width: 10%; margin-left: auto; margin-right: 0;"/> \$369 78

Cattle Commission,

Paper and printing 5000 tracts (Glanders).....	\$31 04
Advertising.....	19 56
Examination of stables and veterinary fees.....	63 00
Transportation and services of agents, etc.....	17 35
Killing and burying 14 horses, June 1st to Dec. 31, 1878....	42 00
“ “ “ 20 “ Jan. 1 to Nov. 1, 1879.....	60 00
	<hr style="width: 10%; margin-left: auto; margin-right: 0;"/> 232 95
Salary.....	\$1,200 00
	<hr style="width: 10%; margin-left: auto; margin-right: 0;"/> \$1,802 73

The value of the stationery, stamps, desk material and utensils on hand, is about the same as at the time of making the previous report.

- 1 vol. *Materia Medica*, Thayer, from Hon. Elisha Dyer, Jr.
 6 " R. I. Registration Reports " " " ... 1853-1858
 By purchase—
 1 vol. *Sanitary Examination Water*—Fox.
 1 " *Hart's Manual*.
 1 " *Qualitative Analysis*—Prof. Appleton.
 1 " *Cameron's Hygiene*.
 2 " *Fleming's Veterinary Science*.
 1 " *Water Analysis*—Wanklyn.

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ARTIFICIAL FEEDING OF INFANTS.

BY

OLIVER C. WIGGIN, M. D.,

PROVIDENCE, R. I.,

MEMBER OF THE STATE BOARD OF HEALTH.

THE Trustees of the Fiske Fund, at the annual meeting of the Rhode Island Medical Society, held in Providence, June 11, 1879, announced that they had awarded a premium of two hundred dollars for the best Essay on "Artificial Feeding of Infants," to an Essay bearing the motto, "*Vivat infans*," and on breaking the seal of the accompanying packet, they found the author to be OLIVER C. WIGGIN, M. D., of Providence, R. I.

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ARTIFICIAL FEEDING OF INFANTS.

THE frequency with which it becomes necessary to take a child from the maternal breast before the proper time of weaning, renders the subject of artificial feeding of infants of great importance. Derangement of the digestive organs is the most fruitful cause of infant mortality; and though these derangements may not always be avoided under the most skilful management of diet, yet it must be acknowledged that the far greater portion of them results from the violation of the most simple laws of alimentation. Physicians are fully aware of the importance of this fact—more so, perhaps, than formerly—and they have made it so much a practical study that any one of them might write a valuable treatise on the subject. It is hardly expected to present anything here which will strike the average practitioner as being new. It is, however, interesting for the most experienced person to compare his own observations with those of his fellow-workers, while the younger student and the public at large, may find something of profit in the records of an experienced observer. Among the more intelligent portions of the community one finds much general knowledge pertaining to infant diet. Physicians have, for a long time, taken considerable pains to teach mothers and nurses something of the physiology of baby-hood. The kind of food found in use is oftener more nearly correct than the method of its preparation and administration. It would seem that a more minute knowledge as to the details of the *manner* of feeding, added to what is already popularly known respecting the materials of diet, would considerably lessen the evils of artificial feeding. In this direction something may be profitably said.

It is hardly practicable for the physician, in his daily rounds, to attempt to instruct mothers and nurses in all the physiological intricacies of digestion, absorption and assimilation, and of the distinctive characteristics of digestion in the infant, but something may be,

and should be, taught. Even a vague idea, on the part of an attendant, as to why she is required to carry out any special process, is better than none. Few persons are so dull as not to like to know the reason of what they are required to do, and it will often be found impossible to get some seemingly trivial manipulation carried out, for any length of time, without giving and repeating an accurate idea of what is desired to be accomplished. But, whatever may be thought of the attendant's knowledge of such things, there can be no question as to the physician's stand-point. Any attempt to correct the derangements of digestion without a full understanding of the special physiological function, or functions, at fault, must result in failure. This statement is not so trite as it might at first seem. It must be unsatisfactory in the extreme to offer advice for the alleviation of a train of evils without a comprehension of the causes which have led to them. The necessities of little dyspeptics are urgent; their suffering is generally very great, and not unfrequently fraught with danger. It is important to their comfort and safety that the physician, who is pretty surely, sooner or later, to be called to their aid, should take in at once the whole situation and be able to direct such corrections in diet as shall bring speedy relief. Only by close observation of the various derangements of digestion in children, and the effects of special articles of diet, and the manner of preparing and administering them, can one formulate his knowledge and be able, with any degree of certainty to suggest means of relief.

The conditions which unfit the mother for nursing her child are very numerous. These conditions afford an important field for investigation. It would be interesting, in this connection, to exhibit the causes which render the artificial feeding of infants necessary, but such considerations hardly seem to come within the scope of this paper. We shall consider the infant as cut off from its mother entirely—as living an independent existence. Nor does it seem necessary to enter into an elaborate description of the various processes of digestion. There are, however, a few distinctive characteristics of infant digestion which it may be well to consider briefly, since we have to keep them constantly in view in all our reasonings and practices upon artificial feeding. We start with the stern fact that the infant has been deprived, from some cause or other—it matters but little what—of its natural supply of food. It is thrown upon our hands to sustain and develop. How best to do this in harmony with nature's methods will be the simple inquiry of this essay.

Whatever is anatomically and physiologically distinctive in the digestive apparatus of the infant, is sufficiently obvious to all but the uninstructed. In the first place, there are no teeth, and simply for the reason that there is no use for them, and because they would be the source of pain and danger to the mother in the natural process of nursing. On the other hand, the toothless gums are a sign of infancy, affording a more accurate measure of that period of human life than any other. With one or two exceptions, hereafter to be considered, a child is to be regarded an infant until it has teeth. Incidentally, also, this definition defines the scope of the subject under consideration. Until solid food can be minutely divided by mastication, it should be conveyed to the stomach in a state of solution or nearly so.

Another peculiarity of the infant is the undeveloped state of the salivary glands. Its natural diet of breast milk being free from amylaceous substances, there is no call for saliva. As one important office of saliva is to start the sugar-forming process in starch, the absence of such fluid would indicate that starchy foods should be withheld until the function of the salivary glands be established. This is not accomplished, to any considerable extent before the age of three months, but after this age, the process of saliva secretion progresses with comparative rapidity.

The stomach of the infant also presents some important peculiarities. It is more tubular in shape than in the adult, being less full in its larger curvature, and consequently narrower at the cardiac end. Its position is more nearly vertical, partly owing to its shape and partly to the relatively larger size of the liver, which projects to the left of the median line, pushing the pyloric end of the stomach with it. This vertical position of the stomach is favorable to the rapid emptying of its contents, not only into the intestinal tract through its outlet, but also through its inlet by the act of vomiting. The readiness with which the infant vomits is the natural safeguard against indigestible materials and an over-charged stomach. But by far the most important fact resulting from this tubular shape of the stomach is the greatly reduced number of pepsine forming glands. These glands are situated in the larger or cardiac end of the stomach, and they are less numerous in proportion to the diminution in size of that portion of the organ. This would indicate a diminished power of digestion of nitrogenous solids.

The pancreatic juice is deficient in the element which changes starch into sugar. This office of the pancreas is delayed even later than the

same office of the salivary glands. Its emulsifying action, however, appears to be in full operation from the first, for the quantity of fat which a healthy infant can digest is considerable.

The intestinal canal of the infant differs in one important function from that of the adult. The glands which secrete the digestive fluids in the adult are not developed to any considerable extent before dentition is pretty well advanced. Hence, any solid particles of food which may pass through the stomach undissolved, continue their course through the intestines without material change. This deficiency of intestinal juices increases the difficulties of artificial feeding. In fact, it constitutes the chief distinction between infancy and adult life, as far as alimentation is concerned. The mucus glands of the intestines, as well as those throughout the digestive apparatus, are very active in infancy, and slight irritations, in the form of indigestible substances, and acrid products of fermentation, produce an abnormal secretion of mucus amounting to disease. This latter circumstance is also one of the great obstacles in the management of diet. Absorption of the liquid contents of the intestines is very active in the healthy child, but is liable to interruptions from much slighter causes than in adult life.

These constitute the chief distinctions of infantile digestion. Their bearing upon the management of diet will be considered more fully in connection with special directions for feeding.

There are two great problems of alimentation, namely, construction and force-production. The former is universally recognized as of equal importance in all periods of life; the latter, though equally obvious, and much more conspicuous in its manifestations, is too often ignored in the care of infants. The most patent fact to the popular mind, in connection with artificial feeding, is the relation between supply and demand. Every one understands that the human frame is made up of certain organic and inorganic substances, combined, in mysterious ways, into bone, muscle, nerve, sinews and other tissues, and that the maintenance and growth of these are directly dependent upon the supply of the same elements, in the same or in different combinations, in materials known as food. This has been called the vegetative view of construction; for it is a law equally applicable to vegetable and animal life. It has been much the custom to regard the infant as little more than a vegetative creature—certainly much more nearly allied to vegetable life than the adult. He is generally put lower in the scale of animal life than the young of

brute species, since they earlier acquire the power for a larger muscular activity. This conception has given rise to grave defects in the feeding of infants. The great demand in the infant economy for the force-producing elements of food is vastly underrated. The usual reasoning seems to be that the infant is a growing little animal, and, in comparison with the young of other species, he is helpless and quiescent. He must, therefore, be supplied largely with the nitrogenous, but more sparingly with the non-nitrogenous elements, while the inorganic materials, so essential to the metamorphoses of tissue-building, are sometimes quite overlooked.

The manifestations of life involve many activities other than those of construction. Consider, for a moment, the relative weight of the internal viscera as compared with the rest of the body; consider the functions they have to perform of secretion, excretion, assimilation, and many other molecular changes constantly taking place in the body; consider the involuntary muscular activity of the digestive apparatus, of the heart and other circulatory organs, of the respiratory movements; consider, moreover, the amount of exercise, both active and passive, a baby gets in the acts of crying, laughing, cooing, kicking and wriggling, and the perpetual bouncing, shaking and trotting by attendants; consider, still further, the vast demand upon the nervous system, not only upon the brain and spinal cord, but upon the peripheral nerves, in the offices which they fill in all the functions just enumerated. What a vast expenditure of force! What a demand for the hydro-carbons and the carbo-hydrates! In short, any practice of feeding which ignores to any considerable extent, the fact that the infant has a nervous and a muscular system must be defective.

The dynamic relations of infant food are not sufficiently appreciated. It has been estimated that the adult body is capable of turning one-fifth of the power of its food into the equivalent of work. (Pavy.) It may be questioned whether the demand for the force-producing elements of food of the infant, whose movements are largely beyond the control of its own will, is not fully equal, proportionately, to that of the adult whose activities are mainly voluntary. The natural food of infants is in a form to give the greatest possible results both of tissue-building and force-production. It can be more completely utilized than is possible with the food of adults. This is evident from the fact that the quantity of unoxidized matter (urea) eliminated from the system when supplied with mother's milk is much less in proportion than when a mixed diet is used. It used to be supposed that the exact

expenditure of muscular force could be measured by estimating the quantity of urea eliminated. I have heard it argued that since babies excrete but little urea, there can be but little waste of tissue from the expenditure of force. It is well known that the quantity of urea excreted depends more upon the elimination of unoxidized materials of nutrition which have never been organized in the body, than upon the waste products incident to the destruction of tissues. It is not proved that urea bears any known ratio to muscular work or to molecular changes in the nerve-tissues. The small quantity of urea found in the excretions of infants must be attributed, then, to the complete utilization of the nitrogenous elements of their natural diet in the process of nutrition.

This is not the place to enter into a full discussion of the relation of diet to force-production; but it may be briefly stated, while urging the attention to the subject, that the production of muscular and nervous force is attributed to the oxidation of various organic substances taken as food, the chief among these being starch, sugar, dextrine and the fats. The value of any alimentary substance, as a force-producing agent, depends upon the amount of oxygen appropriated in the process of oxidation. It is found that fat has the highest capacity for oxidation of any substance used as food, and that sugar, though much lower in the scale of oxidizable substances, still has a considerable capacity for the consumption of oxygen in combustion. One of the products of oxidation is carbonic acid, which is eliminated chiefly through the lungs. This product, if accurately estimated, should furnish a just measure of the force produced. It can hardly be doubted that could the carbonic acid eliminated by the rapid respiration of the infant be collected, the product would exhibit an expenditure of force far greater than is generally believed. And, referring to food again, we should expect to find in the natural pabulum of the baby some indication in its composition of the offices it has to fulfil; and this we do find. We find that the combined percentages of sugar and fat stand to caseine (nitrogenous element) as two to one.

It is desirable that the artificial food of the infant simulate, as nearly as possible, its own natural diet. The best practical resource we have is found in the milk of the cow. It is generally possible, by one modification or other, to suit cow's milk to the digestive peculiarities of the child. If it were not for this resource, or for the milk of some other animal, infant mortality would be much greater than it now is. As a rule the quantity of fat (cream) and

sugar in cow's milk furnishes no obstacle to digestion. On the contrary, any considerable diminution of these materials is a common cause of indigestion, as will be shown hereafter. It is the caseine of cow's milk which produces the greatest amount of disturbance in digestion. It is not only too great in quantity, but it coagulates rapidly and in large masses, thus forming heavy curds, on which the digestive fluids of the stomach act very slowly. It is, therefore, necessary, during the first few months of life to remove a portion of the caseine, or, what amounts to the same thing, to dilute the milk with water. The digestion of caseine is facilitated by three conditions; these are, (1) the presence of a relatively large percentage of fluid in the stomach, (2) its coagulation into small, flakey masses, and (3) the presence of a considerable portion of cream. If the gastric juice is not well diluted it acts rapidly upon the caseine and precipitates it into large curds, which will irritate the stomach and will be ejected by vomiting, or they will pass through the intestine undigested and produce worse effects. It was just said, while pointing out some of the peculiarities of the infant's stomach, that the quantity of pepsine secreted is small in comparison with that of the adult. It is quite sufficient, however, for the purpose of dissolving the caseine of human milk, which is small in quantity (i. e. the milk is more watery), and which has the property of being precipitated in small flakes. But if the quantity of caseine is large (as in cow's milk), the portion first dissolved is sufficient to appropriate the pepsine to a degree to stop further action until more pepsine is secreted or more fluid is added. That is to say, the dissolving power of the pepsine already secreted is not exhausted, but it is simply not in a state of sufficient fluidity to act upon the food. And besides, the portion of food already dissolved is not sufficiently liquid to admit of absorption into the waiting blood vessels. A large portion of the pepsine is manufactured by the peptic glands from nutritive materials, absorbed directly from the stomach at the time of digestion. The first resource these glands have, when the stomach receives milk, is the sugar held in solution, which is immediately available on the precipitation of the caseine. So long as the glands receive the materials to form pepsine, and the contents of the stomach are sufficiently fluid to favor digestion and absorption, the process of dissolving caseine goes on without interruption.

The importance of caseine being in a state of minute sub-division is obvious enough without explanation. This is generally effected readily enough by maintaining the proper proportion of water in the

milk, otherwise it is necessary to resort to other means, which will be explained in another place.

There is one unfortunate circumstance connected with the digestion of caseine which often works great mischief. It is liable to become precipitated in the form of large and tough curds by an excessively acid condition of the fluids of the stomach—not so much by the acids of the gastric juice proper, as by the products of acid decomposition of other elements of food. This result sometimes happens with the use of human milk, but it is very much more liable to attend the use of cow's milk. It is greatly to be regretted, and it is to be prevented as constantly as possible. This precipitated caseine is much more tough in its texture, and consequently more difficult of digestion than the usual flakey coagulum. In fact, it cannot be dissolved in any of the digestive fluids of the infant. It is either vomited violently or it passes through the bowels, growing constantly harder and more indigestible, causing a vast amount of pain and other disturbance. This is the kind of curd seen in those cases of explosive vomiting, attended with an excessively acid condition, and which, in warm weather, is often the precursor of *cholera infantum*. So long as the pepsine and acid of the stomach preserve a proper proportion to each other, or when excessive acidity is prevented by the presence of an alkali, this massive precipitation of caseine cannot take place. Of course the vomiting above referred to is quite a different phenomenon from the regurgitation, or mild vomiting, following feeding, which results from an over-replete stomach.

It was just remarked that this unhealthful acidity of the gastric fluids is due to the products of decomposition and not to the secreted acid of gastric juice. Excessive acidity is due to slow digestion. The *modus operandi* of this acid formation appears to be something like this. The mucus glands are abnormally active in this condition, and the mucus secreted readily takes on a fermentive process, resulting in a decomposition of the sugar and the chlorides of the milk, thus producing lactic, acetic and chlorohydric acids. Another source of acid is the precipitated caseine just described. If it remains long in the stomach it undergoes decomposition rather than digestion, and the product is of the most irritating nature. It seems to act upon the digestive system of a baby like a virulent poison. Its effect is about the same whether the putrefaction is commenced in the stomach or out of it. How often we see a child thrown into the most painful vomiting and diarrhoea from nibbling a crumb of cheese or from drinking milk in which the putrefactive process has begun.

In beginning the feeding of a new-born infant it is always safer to start with a relative deficiency of caseine than to run the risk of upsetting the stomach with an excess. The first week's feeding often decides the fate of the infant. The digestive apparatus often receives, during that time, an amount of disturbance from which it never recovers. It is well to begin a day or two after birth with one part of milk to two parts of water, and add the cream from a quantity of milk equal to that of the water added. To this should also be added four grains of the phosphate and chloride salts, and forty grains of the sugar of milk to each two ounces of water added. In other words, remove two-thirds of the caseine from cow's milk, and restore sufficiently the fat, sugar and salts. The mineral constituents of milk may be imitated nearly enough for practical purposes by an artificial preparation. It is desirable to have an available supply of artificial salts of milk for prescribing. The natural sugar of milk is also more easily digested, and consequently more desirable, than cane sugar. For the sake of convenience and accuracy in the hands of unskilled attendants, the salts and sugar of milk may be combined in the proportions in which they exist in milk. A pound of ash from an average quality of human milk would contain

Chloride of sodium;	298 grains,
Chloride of potassium,	1701 "
Carbonate of soda,	52 "
Carbonate of lime,	71 "
Phosphate of lime,	2970 "
Phosphate of magnesia,	520 "
Phosphate of soda,	25 "
Phosphate of iron,	52 "
Sulphate of soda,	71 "
<hr/>	
Total,	5760 grains.

Milk contains sugar in the proportion of 7.40 parts to one part of mineral matter, and, for the sake of convenience in dispensing, one pound of the salts may be thoroughly mixed with seven and one-half pounds of the sugar. Two ounces of milk contain about four grains of mineral matter and forty grains of sugar. This quantity will fill a teaspoon even full. Now in practice this mixture may be designated in the family as the "baby's sugar," or the "baby's salt." Suppose we wish an infant to have three ounces of food for each meal, it

is very simple to say to the attendant—Take four tablespoonfuls of hot water, two tablespoonfuls of milk, one teaspoonful of cream and one teaspoonful of the “baby’s sugar.” The hot water will generally be found sufficient to heat the milk and nursing-bottle to the temperature of the body, or to “blood heat.” The food should never be fed cold, and it is better to feed it from a nursing bottle. The act of nursing favors the secretion of digestive fluids. It is in accordance with nature’s method.

Robbing milk of a part of all its nutritive elements must tell disastrously upon the infant feeding upon it. A child may need three pints of milk each twenty-four hours to properly nourish it. If, in order to dilute the caseine, two parts of water are added to one of milk, it must either take a daily quantity of nine pints of the mixture, or suffer for the want of proper nourishment in taking a less quantity. At the outset we simply wish to give less caseine, but we cannot afford to do without the sugar, and cream, and salines. We should like to confine the bulk of food to three pints, losing no essential element of nutrition in the attempt to get rid of a portion of one of the least digestible elements. In three pints of a mixture containing two-thirds water, we get but one pint of pure milk, which is not enough to answer the demands of the infant. We must, therefore, restore the sugar and fat, as indicated.

An infant fed upon weakly diluted milk is not only insufficiently nourished, but it is liable to derangements of the stomach and bowels. It may as well be said here, that the quality of milk in use should receive strict attention. If it is proposed to water milk, it must be proved that it has not already been watered before reaching the consumer. It is of vast importance to the baby that its milk be not twice diluted. This is no imaginary danger. Milk may be found in many families every day vitiated by this mode of adulteration.

An insufficient supply of sugar in milk is a common cause of constipation in babies. Sugar is an important factor in the rapid digestion of caseine, as has been partially explained. In the first instance, it furnishes material for the elaboration of pepsine in the peptic glands; and secondly, a portion of it is decomposed into lactic acid, a certain quantity of which is conducive to digestion, by increasing the acidity of the gastric juice. Thus the digested food is passed rapidly out of the stomach before there has been time for an excessive acid decomposition, and the intestines are stimulated by this rapid supply to an increased peristaltic action. More remotely, also,

the sugar furnishes an important oxidizable element in the general system thus supplying the force required by the involuntary muscles of the intestines. While sugar must be regarded an important element in the first stages of digestion, it is also noticeable that an excess of it tends to a greatly increased acidity of all the digestive fluids, thus producing the very evils we would avoid. This is one of the difficulties attending the use of cane sugar, and when this is used instead of milk sugar, as is generally the case, the infant's power of digesting it must be determined by experiment. The capacity of infants in this respect differs very materially.

The immediate effect of fat upon the digestion of caseine is not readily explained. Its mechanical effect is of some importance no doubt. The oil globules are intimately incorporated in the coagulum of caseine, and do something towards rendering it more easily disintegrated. It is possible that fat performs some office in connection with the phosphates held in solution or suspension in the caseine, and which are set free in the stomach to play an important part, with other salines of milk, in the elaboration of the acid elements of gastric juice. Oil has the property of dissolving free phosphorus to a considerable degree, and of appropriating the phosphate and alkaline salts in the process of being emulsified. It is true this process is carried on at a later stage of digestion in the intestines, but the reorganization of the salts commences in the stomach. But, whatever its method of operation, fat certainly renders a larger amount of caseine digestible. It will often be found in practice that the addition of a little more cream to the baby's food will correct any mild indigestion of caseine. At the age of several months, when the child is feeding on nearly pure milk, this observation becomes of considerable importance. Much more cream can be digested than is popularly supposed. We often hear the complaint of the nurse that the milk in use is too "rich"—"it does not agree with the baby." By the term "rich" is almost always meant too much cream. Generally, in such cases, it will be found that the caseine is greatly in excess of the cream. As a shrewd farmer once expressed it, "there is more danger in the bottom of the milk-can than in the top." Within proper limits, the fat of milk will afford no disturbance of digestion unless there is a marked deficiency in the natural mineral constituents of the food. Exceptions will be met with, and now and then an infant will be found unable to digest much fat, just as in adults we meet with the same peculiarity. A little intelligent experimenting will reveal the facts of the case.

It is not necessary to discuss here the part which the fat of milk plays in nutrition. Its importance as a heat-making and force-producing agent, and the office it fills in cell-building and many other molecular changes necessary to the well-being of the body, is universally recognized.

Allusion has been made to the importance of restoring the mineral matter to diluted milk. Of all the errors of artificial feeding, the omission of the various salines which enter into the structure of the body may be considered the most common and the most serious. A large proportion of the vices of digestion, absorption and assimilation, may be traced to this neglect. When we consider how universally the salines are distributed through every solid and fluid of the body, it may be regarded almost a wonder how they become so generally overlooked as a factor of alimentation. From the moment they enter the stomach to the time they are eliminated from the system through the various excretions, they never cease to perform some important office. It would require a small treatise to follow them through the entire *rôle* they play in the animal economy. They are associated with the performance of every function of the body, whether of digestion, absorption or assimilation, whether of secretion or excretion, of endosmosis or exosmosis, of constructive or destructive metamorphosis. It is proposed here simply to point out some of the evils, chiefly to digestion, resulting from their omission from the infant's diet.

The important mineral constituents of milk are chlorine, phosphoric acid and (sparingly) sulphuric acid, in combination with soda, potash, lime, magnesia and iron. Loosley speaking, these may be classified into two groups, designated as the chlorine salts and the phosphate salts—the first group comprising chlorides of sodium and potassium; the second, phosphates of lime magnesia, soda and iron. Whether these combinations represent the precise mode of arrangement under which the salines exist in milk cannot be definitely stated, of course; for the process of incineration employed in their chemical analysis may effect rearrangements of some of the elements and produce new compounds. Happily, however, the several organs of the body find themselves able to appropriate them as they are presented, and of elaborating from them such materials as they need.

Although a proper degree of acidity is necessary to the action of gastric juice, it does not appear that its efficiency depends upon any one particular acid for its digestive properties. Lactic acid is now generally regarded as the free acid of gastric juice, but there is also

present, at the time of digestion, hydrochloric acid and the acid phosphate of lime. Their united presence is suggestive of use; and, while it is safe to say that digestion might go on measurably well under the office of either one alone, it is fair to conclude that their combined action best accomplishes the process.

The use of lactic acid in digestion has been pointed out while speaking of milk sugar. No less importance to the proper formation of gastric juice, and to rapid digestion, is the presence, in abundant supply, of the salines of milk. The chlorides and the phosphates begin their offices as soon as they reach the stomach. The chlorides furnish the chlorine for the formation, with hydrogen, of chlorohydric acid; the phosphate of lime contains the elements for the acid phosphate. Just what the chemical reactions are between these several salts, and how they are effected, is not known. What was said of the manner in which lactic acid acts in promoting digestion and increasing the peristaltic action of the intestines, can be said with equal truth of the other acids of gastric juice. Moreover the process of secretion of *all* the digestive fluids—gastric, pancreatic, hepatic and intestinal—depends indirectly upon the mineral ingredients of food. Slow digestion in babies is almost always attended with constipation. As was before pointed out, the proper stimulus of the peristaltic movements of the intestines is a rapid supply of the well-digested contents of the stomach. If digestion be slow, there is time for an excessive formation of acids, not only the normal acids, but also of the accidental and irritating acetic and butyric acids. If these are passed into the intestines in greater quantity than can be neutralized by the alkaline fluids there found, there will result an acid state of the bowels, and the infant will have an opposite condition—diarrhœa.

The alkaline reaction of the pancreatic juice, as of all the fluids secreted by the intestines and liver, depends upon the salines furnished through the blood to the organs secreting them. If there is an insufficient supply of these materials, in the food, there will be a deficiency in the secretion of the alkaline juices, and the neutralizing capacity of these fluids will be lessened accordingly. The result will be precisely what it is when an excessive quantity of acid is received from the stomach. So, from the same error in diet, we may get alternate constipation and diarrhœa, according to the quantity and quality of food administered.

It is hardly necessary to say, while pointing out the evils of an insufficient supply of mineral matter, that an excess of these same ma-

terials may result injuriously. Osmosis is a constant condition of normal cell-life. Transudation in and out through the walls of the cells depends upon a saline condition of the fluids to be transmitted. If this saline condition be excessive, transudation is too rapid, and before there has been time for the cells to appropriate the constructive elements of the nutritive juices they are poured off through the excretory organs—chiefly by the intestines—and we have, as a result, a wasting diarrhœa. This is an accident, however, which but seldom attends artificial feeding, for the quantity of salts is oftener defective than excessive.

Of all the omissions of the mineral ingredients of food, none has seemed to me so common and inexplicable as the omission of any potash salt whatever. If reference is made to the percentages of the different salts of milk, the large proportion of potash will be very noticeable. If, in nature's typical food, potash appears to be so important an ingredient, how can any artificial food of the infant be deprived of it without serious effects? Soda is generally supplied in abundance—too often in excess—in the form of chloride of sodium (common salt), and more rarely, in the practice of some, in the form of phosphate of soda. Important as this element is, it can never fill the office of potash in the living system. Their close alliance in chemical properties does not make them equivalents in their physiological offices. That each of these minerals has a specific office is evident enough from the special way in which they are distributed. "Thus, in the blood—and here the circumstances are of the most favorable nature for an equal distribution of saline matter, if a special appropriating action were not in operation—it is found that phosphates and potash salts predominate in the corpuscles, and chlorides and soda salt in the plasma around. Again, as regards the distribution of potash and soda generally, it is noticeable that the former is the alkali belonging particularly to the formed tissues, the latter to the infiltrating fluids." (Pavy.)

Of the formed tissues the muscles and the skin appear to suffer most from a deficiency of potash in the diet. It will sometimes be found that the weak, flabby muscles of an ill-fed infant will take on a more healthy nutrition under the use of certain potash salts added to milk or other food, while some of the cutaneous eruptions of the scalp and other parts of the body, are very speedily cured by their use. It has always seemed to me that the craving which babies of a few months of age almost uniformly manifest for potatoes over other

vegetable diet is due largely to the great percentage of potash contained in them.

The bare mention here made of the importance of the mineral materials of food, is for the purpose of calling general attention to the subject rather than for any exhaustive explanation of what is known and acknowledged by all physiologists.

We return now to the general diet of the infant. It is well to begin the feeding of cow's milk considerably diluted, with the cream, sugar and salts restored, as has already been explained. A new-born infant will require three to four ounces of a mixture containing one part milk to two parts water, every two hours. The proportion of milk and the quantity of food should be increased according to the digestive powers of the child, irrespective of age, feeling the way along carefully. The food should be prepared anew at the time of feeding, and not in quantity for the day. Milk decomposes rapidly after it has been watered, particularly in warm weather. In proportion as the milk is increased the added elements should be diminished. It will generally be found practicable to feed a healthy vigorous baby of five months of age upon clear milk — sometimes at an earlier age. It is desirable to get the child on a pure milk diet as soon as possible.

The value of "one cow's milk," which has been so generally considered desirable, is no doubt greatly over-estimated. Were the supply never so desirable it would be difficult to procure it. Few persons in cities keep a cow. The people are dependent upon the honesty and carefulness of the milkman. They do not understand the amount of watchfulness required to insure a uniform quality of milk from one cow. In fact it is well nigh impossible. It involves the system of feeding and the general care of the animal, as well as the after management of her milk, all of which must be delegated to hired help. The milk of any single cow must be much more variable in quality than the mixed product of an entire herd. Any accident of feeding, or any other condition modifying the quality of one cow's milk, would not materially change the quality of the mixed product of an entire dairy, whereas such accident might modify one cow's milk to a degree to prove injurious, or even fatal, to an infant feeding upon it. Under any ordinary management the entire yield of any one cow may be lost for one day, and generally, it is safe to say, the accident will not be reported to the customer taking the milk. The annoyance and danger of such accidents are sufficiently frequent to render the practice in question undesirable. A pure, sweet and rich

milk from a well-managed dairy is all we need demand, and we should be thankful for that. Those who insist on the use of milk from one animal would do better to use goat's milk. This will prove uniformly satisfactory. The goat should be kept on the premises where she can be milked at the time the child needs feeding, and the milk given warm and fresh from the udder. She makes an excellent step-mother. Her milk contains less of caseine and more of sugar and of salts than cow's milk, and moreover the salts are richer in phosphates than those from any other kind of milk. A sample of goat's milk which I analyzed last summer contained—

Caseine,	3.50
Fat,	4.10
Sugar,	6.00
Salts, . . . . .	.70
Water,	85.70

This milk was fed diluted with water in the proportion of one part water to four parts milk. After three months it was given clear as it came from the animal. The large percentages of lactine and of salts in goats milk have never in my experience proved any disadvantage.

Condensed milk sometimes proves very useful. Its use is not followed by very uniform success. The large amount of cane sugar which it contains furnishes an obstacle to digestion not easy to overcome completely. Still, in a few instances, I have found it to agree with the stomach when nothing else would, and apparently save the life of the child. For some cause the Swiss milk appears to be the most readily digested. It is to be regretted that some caution is necessary even in the use of condensed milk. It is generally thought that condensed milk cannot deteriorate while hermetically sealed. This is a mistake. It certainly does undergo some kind of deleterious change if exposed for a long time to the direct rays of the sun. This has happened several times under my own observation to samples which had been exposed in shop windows. In one instance the fat had partially decomposed into butyric acid. The sample was taken from the show-window of a shop where the summer sun had been pouring in upon it for a considerable length of time. In very large cities, where it is impossible for the masses to get fresh and pure milk, condensed milk must supply a great need.

When an infant's stomach has become completely incapacitated, from mismanagement or other cause, for digesting milk, it is well to

change the food for a short time—sometimes several days—until that organ has had sufficient rest to perform its regular office. During this interval of rest, rice-water and cream may be given in the proportion of five parts of the former to one part of the latter, and sweetened slightly with sugar of milk. Or, if desired, arrowroot may be used instead of rice water. It should be boiled until thoroughly hydrated, and made very dilute. Cream and sugar should be added as with the rice-water. These liquids should be fed often and in minute quantities—a few teaspoonfuls every hour. They are not foods in any important sense, and they should not be continued beyond a few days. If, from any cause, it should appear necessary to continue their use beyond a week, it is better to add teaspoonful doses of beef-juice from a fresh roast or from steak. At the same time a little rennet whey will often prove of service. In fact, the whey will often prove serviceable in connection with other forms of diet, from the pepsine contained in it.

On resuming a more substantial diet—and this should be done as soon as the circumstances will admit—the same caution should be observed as in the commencement with a new-born infant. It will occasionally happen that the diluted milk diet first described will not be tolerated by the stomach, and it will be found that some other modification of milk will suit better. As regards the physician's connection with such cases, i. e., when the little dyspeptic has actually become a patient, it will generally be found that various expedients have been tried by the mother, nurse and neighbors, and the baby has meantime attained about the age of three months. This is the age at which it will begin the digestion of some amylaceous substance tolerably well. When this can be borne, it is, no doubt, an aid to the digestion of caseine. The aid is chiefly mechanical. Any substance which causes caseine to coagulate in a state of minute sub-division aids its digestibility, inasmuch as it is now in a condition to be acted upon rapidly by the gastric juice. A slight modification of a diet recommended by Drs. Meigs and Pepper of Philadelphia (*Diseases of Children*,) is one I have used with the greatest satisfaction. The formula is:—

Milk,	One pint.
Water,	One quart.
Arrowroot,	Two teaspoonfuls.
Gelatine,	One teaspoonful.
Cream,	Three tablespoonfuls.
"Salts of Milk,"	One even teaspoonful.
Sugar of Milk,	Four tablespoonfuls.

Boil the arrowroot in the water till thoroughly hydrated (till it is transparent), dissolve the gelatine and sugar in the same, add the milk, and scald, adding the salts and cream after the food is taken from the fire. This mixture should be kept in the ice chest, and a quantity sufficient for one feeding warmed over as required. The vessel in which the food is cooked should not be placed directly in contact with the fire for fear of scorching. It may be placed in another vessel partly filled with water. I have never found any other food so uniformly successful, after the stomach has once been thoroughly deranged. If given in quantity and at intervals suited to the child, *and adhered to*, it will seldom fail to have the desired effect. It is important to adhere in a reasonable degree, to some system of diet. It is bad practice to change the food every two or three days in hopes of finding something better suited to the case. This practice alone would be sufficient to derange the stomach of a healthy infant. Indeed, this is often found to be the sole cause of the trouble, in artificial feeding. The "salts of milk" used in the formula have already been sufficiently explained. If the sugar of milk seems objectionable on the ground of expense or trouble, cane sugar can be used sparingly, and a small pinch (say three grains) of the salts added to each meal.

If possible, milk, in some proportion, should enter into the diet of the infant. In all cases, before abandoning its use, it should be ascertained beyond a doubt that it is really the milk itself which is the disturbing element. There should be a thorough investigation of the child's general management. Probably no function of the body is more sensitive to disturbing influences from without than that of secretion of gastric juice. Let every untoward circumstance be well canvassed. Many inquiries will suggest themselves to the careful observer. Is there sufficient cleanliness observed in all the details of feeding? is the baby over fed? is he too often over-fatigued? are there errors in bathing? is he kept warm enough? is he prostrated by heat? are there hereditary tendencies to dyspepsia? are there constitutional vices, such as scrofula, syphilis, or tuberculosis? These are some of the many relations affecting digestion, all of which must be kept constantly in mind.

Cleanliness in every detail of feeding is of the first importance. A sour nursing-bottle, or milk-can, or other utensil will start the fermenting and putrefactive process in milk very rapidly. Milk thus tainted is certain to upset the stomach. Many very young infants are kept in constant ill health from this cause.

Over-feeding is the most common of all the causes of indigestion. It consists either in giving too great a quantity for each meal or in feeding a less quantity at too frequent intervals. The food itself may be perfectly adapted to the child's powers of digestion, but, through carelessness or ignorance in administering the proper quantity, the digestive organs are kept constantly at work. It is only a question of how long they can endure such overtaxing. An infant which is fed every two hours should be through digesting in one hour, leaving the other half of the interval for rest. Or rather the stomach should be empty for that length of time. Intestinal digestion will be going on more continuously, of course. Children fed at longer intervals do not need fully one half the period for rest, perhaps, but the stomach should be empty one hour, at least, of each interval. An over-fed infant is in a state of constant malaise. It cries fitfully, and worries continuously; it seizes with avidity everything presented to it in the form of food. This habit is, in the minds of the attendants, a sure indication of hunger. In all discomforts of digestion, short of severe pain, babies are notoriously ravenous. It is difficult to convince their attendants of the true condition of things. "The baby is half starved," they say, which may or may not be true—very likely it is true, if insufficient food has been digested to nourish the body, but he will continue to starve until the stomach can be brought into a condition to prepare food for absorption. Directions for feeding should always be precise as to kind, quantity, frequency of feeding and the method of preparation. Attendants should be made to understand that the suitability of food depends as much upon the completeness with which it is digested and absorbed as upon its nutritive value *per se*—that the child is nourished by the quantity of food it appropriates, and not necessarily by the quantity taken into the stomach.

One very common cause of over-feeding is thirst. It does not always occur to the mind of the nurse that a baby whose diet consists exclusively of liquids may often be thirsty. Children often cry from thirst when it is supposed they are hungry. This most often happens in the night. The bottle is offered, which is seized with avidity, and thirst is quenched for the time being, but the already overloaded stomach has thrust upon it an additional burden, when a little water would better answer the requirements of the case. A child that may require but a moderate amount of food, may, nevertheless, require considerable liquid; and the peculiarity continues on through life. And besides, over-feeding itself generally induces thirst. Cold water is the

most refreshing and acceptable drink to the child, and unless some special condition of the system interdicts its use, it should not be denied.

There is the utmost importance of observing the very first indications of indigestion in the baby. Sometimes he will be worrisome; cry fretfully and writhe uncomfortably; he vomits solid curds, or belches sour smelling gasses; his belly feels hard and distended with "wind;" there may be slight looseness of the bowels, the dejections usually containing numerous undigested masses of caseine; he starts and turns in his sleep, bites upon his gums and draws up the muscles of his face as if about to cry or to laugh; his cheeks have large red patches, and he seems feverish at times, or perhaps he perspires too profusely. These are usually indications of indigestion, and most likely they are caused by over-feeding. They are almost always noticed by the nurse, but they are not considered of sufficient importance, even if their true import is understood, to call for any modification of diet. In all such cases, if the customary food were greatly reduced, or withheld altogether for a few hours, the stomach would soon be in a condition to proceed with its labors. This simple injunction, if observed at the right moment, would save a vast amount of illness and even of mortality among infants.

Muscular and nervous fatigue are too often the cause of indigestion. The infant is exposed to many causes of over-fatigue. The number of evolutions the average baby is put through in the course of each day is something remarkable. The rude handling it undergoes during every waking hour by tossing, jolting, violent rocking and shaking; the constant attempt to teach it to stand and walk; the bowling along rough walks in a carriage by boisterous children, are all sources of muscular fatigue which would be trying to an adult. The nervous system is also kept in a state of tension. The intelligence of the child is continually appealed to. The activity of the brain after the first few weeks of life, must be very great. The little creature finds itself in the midst of wonder-land, and the number of mysteries it will unravel in a very few months borders on the marvelous. Its fond relatives are pleased with its brightness, and unduly excite it to the performance of new tricks. Bright glares of light, sharp sounds, little starts of fright from strange attitudes and sudden approaches, the constant rattle of vehicles on the street, the clatter of neighboring machinery, the rude awaking from sound sleep—all these are violent shocks to the sensorium. A single occurrence of the kind is

bad enough, but a frequent repetition must needs enervate the strongest infant. Babies should be protected from violent transitions. They need rest and quiet at regular intervals, and an abundance of it. It will sometimes be found impossible to adapt any form of food to the digestive powers of an infant until it has been moved from its noisy locality to a more quiet street, or to the still more quiet country.

Bathing, when too often repeated, or when the body is kept too long exposed, or when the water used is too cold, will weaken digestion in feeble infants. They generate heat slowly, and the temperature of the body is so much reduced as to interfere with all its functions, digestion included. Besides, they lose heat more rapidly by radiation than strong, fat babies. Fat is a slow conductor of heat, and when all the interstices of the body, and the areolar tissue beneath the skin, are well stored with fat, the loss of heat is comparatively slow.

The want of sufficient clothing also tends to the same results, even in robust children. A decided chill puts an immediate stop to all digestion. We see practical demonstrations of this every day during the summer months, when there is less care taken in protecting the child from strong drafts of air, from exposure in the early evening, or from nakedness in the night. He gets a chill; a little shudder goes through his frame; in a short time he vomits his last meal as he swallowed it, untouched by the gastric juice; a sharp diarrhoea follows soon afterwards, or an attack of genuine *cholera infantum*. The infant's loss of heat from radiation is much more rapid than in an adult twenty times heavier, not only from its smaller bulk, but from its greater relative surface. The skin surface of an infant weighing eight pounds is twice as great to each pound of its weight as that of an adult weighing one hundred and sixty pounds. It can readily be seen how much greater are its chances of a chill from temporary exposure. It will often be found that a feeble infant insufficiently clad will materially improve in its digestive powers as soon as it is kept sufficiently warm.

Protracted heat, though less depressing to the nervous system than continuous cold, is the cause of much injury to the digestive apparatus. Heat is more detrimental because less easily avoided than cold. The latter can be overcome by artificial means always at hand, while the former is often a condition of climate which cannot always be shunned. It is not necessary, in this connection, to go into an elaborate description of the manner in which protracted heat debilitates the

nervous system, and, consequently, the digestive functions. The fact recognized, its practical bearing upon feeding becomes of importance.

During the hot summer months, the very first indications of derangement of the baby's digestion should receive immediate attention. Any unusual vomiting, or excessively acid eructations, or flatulence and colic, or obstinate constipation, or the slightest tendency to looseness of the bowels, all demand appropriate modifications of diet. Before these more conspicuous symptoms appear, however, there is usually more or less of griping pain in the intestines, as evinced by the fretful, worrying state of the child. This condition may exist several days, or only a few hours, before any decided outbreak of graver symptoms. This is the period when a brief suspension of all nourishment demanding any considerable digestive power will prevent the serious disturbances enumerated. At this time, also, extra care in keeping the belly and feet warm should be observed. It is a time, moreover, when any sudden changes in temperature, as from heat to cold or cold to heat, are greatly to be dreaded. How often, during a protracted term of heat, when the child has become in a manner acclimated, and through infinite pains his diet has been suited to his powers of digestion, a sudden change to a cooler temperature has proved the last shock to suspend digestion altogether! At this season there is great risk in making any experiments in diet. Not even the small liberty of variation commonly allowable in an infant's diet should be ventured. The kind of food found by experiment to have most uniformly agreed with it must be strictly adhered to. During very warm days a little weak brandy and water—say ten drops of brandy—may be given every hour to prevent languor and an irritable condition of the nervous system. This simple practice will many times avert the evils so much dreaded.

There is a popular notion that teething has much to do in deranging the digestion of infants. There is no doubt that the pain of dentition may irritate the nervous system, and prove, with other exciting causes, a true source of disorder. But it is noticeable that in winter no such effect accompanies dentition. It will be remembered that, while speaking of the distinctive characteristics of the infant's digestive organs, it was stated that the follicles which secrete the intestinal digestive juices are not developed until the period of dentition. Here lies the real source of trouble. The intestines are then in a transition state from the infantile to the adult condition. They are more than usually sensitive to disturbances from slight causes, and they are sub-

jected to new aliments from the fact that the infant is generally allowed to test pretty freely his new organs of mastication. Very little disturbance of digestion need arise from this cause if the child be treated as an infant until the first dentition is pretty well advanced.

Hereditary tendencies to dyspepsia are also great obstacles to artificial feeding. These do not always have any connection with the more marked constitutional ailments, such as scrofula and tuberculosis. An infant may be born in a debilitated condition. From the very first it is unable to digest any suitable food. Such children are more likely to die than to live. Sometimes, however, they appear to have inherited, with their weak stomachs, a great tenacity of life, and they live along till the proper period of infancy is passed, when there is usually some hope from the development of the intestinal follicles. But they are always dyspeptics, whether they are one year or a hundred years old, as their parents, and perhaps their grand-parents, were before them.

But little has thus far been said concerning farinaceous articles of diet. At the age of twelve months, and frequently at a much earlier age, an infant can digest starchy foods very well. To begin with, they should be partly digested by cooking, i. e., they should be given in a liquid form. A mixed diet is, from one cause or other, frequently preferable to clear milk. It may be preferable on account of the difficulty which many infants experience in digesting milk alone, or it may be desirable in the relief of the obstinate constipation which is so common in babies brought up by hand. The *modus operandi* of amylaceous substances in connection with the digestion of milk has already been sufficiently dwelt upon. They should at first be given in a liquid form, as a kind of preparation for the more solid farinaceous articles which are soon to form a considerable part of a more substantial diet, such as potatoes, rice, bread and oatmeal porridge. Oatmeal and wheat flour are the two most valuable and most accessible of the starchy foods to begin with. They should be thoroughly cooked in a liquid state before being mixed with the milk. When oatmeal is used, the thin gruel should be thoroughly strained through muslin to remove any hulls or undissolved grains. The quantity used in proportion to the milk may be varied to suit the demands of the case.

We now and then find an infant that cannot digest milk in the least quantity, or in any combination whatever. What is to be done? Our resources are by no means so limited as might at first appear. These children always seem to me to have a kind of compensatory peculiarity of digestion—a greater capacity for the digestion of starchy foods.

In the first place, there is the entire list of patented prepared foods, each of which claims special advantages. I have never refused to try a single one of them which has ever been brought to my notice. My success with them has not been such as to induce me to resort to them before first trying the farinaceous preparations extemporized at home. They are convenient, expensive and theoretically "scientific"—three qualifications well calculated to recommend them to popular favor; but they fail, for some reason, to satisfy the demands of the infant economy beyond a few days. When they have been pronounced successful, they have been used in combination with milk, which, of course, is another phase of the question.

In oatmeal we have one of the most valuable forms of diet for infants. I should place it first on the list of farinaceous foods. It undoubtedly has some advantages over all others. The starch globules are smaller and more readily hydrated on boiling, it contains more fat or oil than any other of the cereals, except maize, and the gluten is abundant and more readily digested than that of any other grain except wheat. It is also rich in soluble salts, while the husk and envelope contain but little of those elements which irritate the alimentary canal and tend to diarrhœa. In short, it approaches more nearly the standard of a typical food than any other of the cerealia. If it fails to agree with the stomach, the cause is oftener found in its method of preparation and administration, or in the quality of the meal, than in the digestive powers of the infant. Here, as in every other article of infant diet, it is necessary to exercise every caution in selection; for oatmeal is liable to deterioration from fermentation and from the presence of acari, various forms of beetles and worms. These creatures leave excrements in the form of minute granular particles, which furnish a nidus for certain fungus growths, giving the flour a peculiar musty odor.

Success in the use of oatmeal depends upon three conditions, namely, the good quality of the meal, its proper preparation and the quantity administered. As regards quality, a sufficient intelligence on the part of the purchaser should be a protection against imposition. It is easier to procure superior grades now than formerly, since oatmeal has become a regular article of household diet in most American families. The occasional prejudice in favor of imported brands is a mistaken one, for the reason that they cannot come to us so fresh, and they are sometimes adulterated with rye and barley flour. These spurious additions, and especially the former, are grave defects, attended

with danger. It is well known that they possess properties very liable to produce diarrhoea. For infant food it is not necessary nor desirable that oatmeal should be bolted. The more of the cortex or envelope there is left in the meal the better, provided the husks are tolerably removed. In straining all the coarse elements are removed, and it is desirable, in the process of cooking, to extract the nutritive principles from the grain as they are provided by nature.

In preparing oatmeal for food it should be boiled for a long time—not less than two to three hours. When it is to be the regular diet of the child, a special cooking apparatus should be used, for the sake of convenience. All the tin shops keep what is known as the “oatmeal kettle.” It is a kettle within a kettle arranged like the common glue-pot. The outer vessel is partly filled with water, so that the inner one is not brought in direct contact with the fire. The apparatus can be left on the range without any watching, thus avoiding the risk of scorching the food. In cooking the mass should be kept in quite a liquid state, the more readily to extract and dissolve the nutritive elements, and to facilitate straining. It should be strained through coarse muslin, and, if necessary, afterwards diluted with water to the specific gravity of milk (1031.) A little cream and milk sugar may sometimes be added with advantage. Oatmeal gruel, as thus prepared, will seem, to most persons, extremely unsubstantial, and the constant temptation will be to make it “thicker.” The most emphatic injunctions of the physician as to this point will many times be disregarded; the attendants will persist in giving the gruel too heavy, and all his pains will be thrown away. The baby cannot digest so much starch and gluten; acid fermentation takes place, and vomiting and diarrhoea follow.

The quantity to be fed at any one time must be determined by experience in each individual case. It should be small to begin with, and the way felt along gradually, as in all other forms of diet. Gruel made in the way just described does not differ much from milk in nutritive value, bulk for bulk. In the hot weather, it is well to give a little brandy and water, in the same way and for the same reasons as already mentioned.

For some reason, there is an absurd disposition on the part of attendants to be continually tampering with the baby's food. He may be thriving famously on any given food—the oatmeal gruel for instance—and some one suggests that it is too “sloppy,” it ought to be given heavier, or milk should be added, and forthwith the change is

made. Exit baby. If the food is fulfilling the demands of the case, not the slightest deviation should be made—above all is this important during the hot summer months.

Another very valuable farinaceous diet may be prepared by subjecting wheat flour to a temperature sufficiently high to change the starch into dextrine. This is usually done by tying a pound of flour tightly in a cotton cloth and keeping it in a kettle of boiling water for six to eight hours. When the cloth is removed the flour is found in the form of a hard ball, enveloped in a tough skin of gluten. The skin is removed from one side leaving the remainder for the protection of the ball. A portion is grated off whenever required and made into a thin gruel. In changing the starch into dextrine, by the process of boiling, the first stage of digestion is already accomplished before it is taken into the stomach. It also possesses the additional advantage of requiring but little cooking when needed for use, and it can be made into a gruel in a few minutes. Generally the temperature of boiling water is not sufficiently high to change so large a mass of flour into dextrine, the centre of the ball remaining unchanged. The process may be completed by subjecting it to a moderate heat in an oven for an hour longer, using all precaution against burning. The sense of taste is the best test in determining whether the process is rightly accomplished. The mass has a sweetish taste easily recognized when once learned. It should have no raw, starchy flavor. This diet is very palatable and easily digested, rather more so with some children than the oatmeal gruel. It is not, however, so typical a food. Finely bolted wheat flour is almost wholly deficient in fat and in mineral constituents, both of which are needed in the diet. It is advisable, therefore, to add the cream from a quantity of milk equal to that of the gruel used, and also one of the alkaline carbonates and the phosphates, in about the same proportion in which they exist in milk. The gruel should not be sweetened much. This is an excellent form of farinaceous food to use in combination with milk, when the infant can digest milk.

In those cases where dentition is delayed several months beyond the average time of appearance of the teeth, from a scrofulous condition, or from rickets, it may be well to consider the child as in a measure passed the period of infancy, and modify his diet accordingly. He now needs rather more of a variety, and many things can be given in a semi-solid form, which need but little division by mastication. Such, for instance, are finely mashed potatoes, moistened with milk, or

sweet butter, or juice from a roast of beef. Soft-boiled eggs are very suitable, and such children are more than usually fond of them. The egg is another typical food. The yelk is rich in oil and the phosphates, and well-adapted to scrofulous children. Beef juice and animal broths may be given in small quantities. Home-made stale bread, plain "cookies," oatmeal mush with cream, are all relished and digested fairly. Sometimes raw beef, scraped into a fine pulp, and seasoned lightly with salt, may be fed a teaspoonful at a time, with great advantage. The digestion of the more solid farinaceous foods may be greatly aided by giving a little malt (diastase) with the meals.

Who is to decide whether the food is agreeing with the infant—the physician or its attendant? Both; but first the physician, and more particularly in those cases where the attendant is inexperienced. The nursery is a veritable *kindergarten*, in which many "object-lessons" are to be learned. In most American families the mother is the nurse, and, in many instances, the sole attendant of her infant. This is as it should be. The maternal feelings quicken the intelligence and make the mother an acute observer, and a ready listener to all that concerns the welfare of her offspring. A little physiological lecture will give her all the principal points connected with the digestion of milk. She must be taught what to observe, and given some general idea of the significance of her observations. She will thus know in season what requires the attention of the physician. She should know what constitutes a natural stool, for instance, and what a healthy mouth and a sound skin are.

Though not strictly within the province of this essay, it may not be inopportune to say a word in conclusion about wet nurses. The trouble and danger of artificial feeding are so generally understood they are greatly dreaded by all concerned. Those able to employ a wet nurse are often inconsolable in their repeated failures in procuring one. I have shared their disappointments in fruitless efforts in their behalf. A good wet nurse is so rare a creature I have quite given up the search for her. The chances are that a goat will serve a better purpose, and she can be obtained with one half the trouble, and be free from all risk of disease. Wet nursing as a rule must necessarily be a failure. The relation between nurse and child is, in a very important sense, an unnatural one. Except in rare instances the feelings of maternity are wanting. The nurses belong to a class of "unfortunates." They come from the poorer classes, and from all nationalities. They are the victims of distressing circumstances.

They have either lost their own baby, or deserted it in the stress of poverty for the hire of nurse. They are the creatures of grief in either case, and they come to their new charge with a "far away and long ago" look painful to behold. In many instances they are obtained several days after the loss of their own child, when lactation has already become lessened from the effects of grief and other causes. Their painful recollections and new surroundings produce a mental state unfavorable to the free and healthful secretion of milk, and the chances are they will give out altogether in the course of a few weeks.

THE
VENTILATION OF SCHOOL HOUSES,

BY
WILLIAM A. MOWRY, A. M.,

PROVIDENCE, R. I.,

THE VENTILATION OF SCHOOL HOUSES.

Dr. C. H. Fisher, Secretary State Board of Health:

DEAR SIR:—You have asked me to give you a paper embodying the results of my experience and observation upon the Ventilation of School Houses.

I cannot enter into any exhaustive treatise upon this important subject, nor would it be desirable, if I had all the time and facilities at hand to do so. But, I apprehend, what is most needed in this utilitarian age, is the result of experience—practical facts.

Let me then, as briefly as I may, give you some conclusions at which I have arrived, and which I believe will be found to be correct and scientific. For more than twenty-five years, during which I have been constantly engaged in teaching, I have been compelled to give more or less attention to the subject, and during some of those years, it has been one of the leading topics of my special study.

I need not say that I have found as wide a diversity of belief and of practice, concerning principles and facts, as upon almost any other subject that can be named.

It is not to be wondered at that the most crude and erroneous ideas remain in the public mind, when the highest authorities differ so widely in relation even to the most fundamental principles.

1. In what do the noxious elements of foul air consist?
2. Do the poisonous gases—carbonic acid, for instance—rise to the top, or fall to the bottom of the room?
3. Hence, should the foul air be drawn off from the top or the bottom?
4. Should the bad air be *drawn* or *forced* out of the room?
5. Is steam heat better than furnace heat?
6. Is direct, or indirect radiation from steam pipes to be preferred?

These are only examples of questions upon which the most diverse answers are given, and that by intelligent people, and even those

who have made the study a specialty. We have only to visit our school houses, in any part of the country, our court houses, our churches, or public halls, to be convinced that correct principles of ventilation are successfully applied but very rarely.

CARBONIC ACID.

It was formerly considered by many that carbonic acid, being heavier than the atmosphere would sink to the floor, and must be taken off from there rather than from the top of the room. Many exhaustive experiments, however, have shown, that in accordance with the universal law of the general diffusion of gases, this poisonous element soon becomes universally diffused throughout the air, especially when the air is kept in constant agitation by moving about the room, as, for example, when large classes leave their seats to take places for recreation, and return.

Indeed, if you place the open mouths of two jars together, the one upright and the other inverted, with the lower one filled with carbonic acid gas, and the upper one with hydrogen, the lightest gas known, in a short time they will be found to have become almost perfectly and equally intermingled throughout the whole mass.

But this carbonic acid, breathed out from the lungs, is not the only unhealthy element found in the air of a school-room. There are constantly floating in such air considerable quantities of animal matter, effete effluvia, thrown off from the skin, exhaled from the lungs, or otherwise interjected into the air, which, perhaps, may prove quite as deleterious as the carbonic acid.

OBJECT OF VENTILATION.

The object of ventilation is two fold, and not as so often regarded, simply for *one* purpose.

1. It must introduce into the room a constant and sufficient supply of pure air from without.

2. It must carry off from the room the air already rendered impure and which holds the deleterious elements. The well known "Sexton's plea for pure air," shows with more graphic vividness, perhaps, than elegance, the necessity for a constant supply of pure air to be furnished, where many pairs of lungs are constantly vitiating the air to be breathed. We have right here, therefore, one of the fundamental principles, always to be remembered, that *a supply of pure air*

must constantly be kept up. It is useless to make ventilating shafts, to carry away the impure air, so long as there is no supply of fresh air furnished.

This principle of a *constant and abundant supply* of fresh air cannot be too strongly insisted upon.

No one method of heating or of ventilating will answer in all cases, since the conditions vary so widely. For example, in a country school house of but one room, usually heated by a stove, a very different set of circumstances exist from the case of a city school of eight, ten or twelve rooms under one roof, and perhaps upon four different floors. What would be easy and rational in one case has no application in the other.

A COUNTRY SCHOOL HOUSE.

In the one-room building, heated by a stove, one of the best methods of obtaining an even temperature and wholesome air, is by having (1) a double cylinder stove, with hot air chamber or passage between the *real* stove and the outside covering, and (2) to furnish a supply of pure air and take off the bad air, by a Robinson's ventilator.

From 1865 to 1870 I used the stove here suggested, in a room about thirty by forty feet in size, with from forty-five to fifty pupils. The room was heated throughout the cold season with less than two tons of coal, (one season using but a ton and a half.) Some of the pupils sat within five feet of the stove without feeling excessive heat, and others were sufficiently warm on the opposite side of the room. The temperature of the two sides of the room—on one side within five feet of the stove, and on the other side nearly fifty feet away—would show a variation by the thermometer of not more than two degrees. By this method the cold air is drawn along the floor slowly from all points, and the heated air thrown out at the top of the stove passing to all parts of the room.

The Robinson's ventilator placed in the upper part of the room and passing out through the roof will constantly pour in a supply of pure air on the one side, and take away the foul air upon the other, and this too without producing an objectionable current upon the heads of the pupils.

A CITY SCHOOL HOUSE.

In large houses, consisting of several rooms and on different floors, other means must be provided. Let us consider several of the principles involved.

I.—SURFACE AND CUBICAL CONTENTS.

It is of great importance to have sufficient space for a proper quantity of air.

A room designed to seat forty to forty-five pupils—at the most fifty—should be 30x40 feet, thereby having a floor of 1200 square feet.

The height of the room should be not less than twelve nor (ordinarily) more than fifteen feet. A good rule is to allow, *in all cases*, twenty-five square feet of flooring and three hundred cubic feet of air to each pupil.

II.—HEATING.

The public have been entertained of late years—if not enlightened—with much discussion of the relative merits of furnace heat and steam heat. We have had all the changes rung upon the superiority of the latter over the former. “It is a soft heat;” “a moist heat;” “has a more healthy, life-giving, invigorating tone,” &c., &c. I would not say that the modern method of steam heating has no advantages. It is not affirmed that this method of heating is in no case a success. There are many instances in which intelligent people are entirely satisfied with it and would have, if possible, no other method. Yet I am fully persuaded, that, as a general rule, for school houses, it does not prove so satisfactory as furnace heating, and that the present tendency of the public mind in swinging back from the steam heating to furnaces is in the right direction. My own observation and experience lead me to believe that good furnaces, properly arranged and carefully kept, will afford better results in relation to ventilation, quality of air, quantity of heat and cost of heating, than the most approved methods of steam heating.

The popular idea that steam heat imparts a softer, moister, purer tone to the air, possibly may rest somewhat upon the imagination.

When water is boiled in an open vessel it gives off steam, and this, of course, conveys moisture into the air. “Heating by steam,” therefore, very naturally suggests the boiling tea-kettle. But close the boiler, air tight, and convey the steam around the room and out of it, in air tight, steam tight pipes, and how, pray, can these pipes, heated by steam, give a *moist* tone to the air?

The only way it can be done is by opening a stop-cock and letting out the steam. But, if moisture is needed it can be obtained, in a much more desirable way from a furnace than by opening an escape valve in the steam pipe and letting out a quantity of dirty, filthy

steam, formed from dirty water, impregnated with iron rust and oil.

Place an evaporating pan in connection with the furnace, supply it with pure, clean water, and in a large furnace, suitable for school purposes from two to four pails of water a day may be evaporated, in cold weather, especially if the air be unusually dry, so as to render this evaporation desirable.

It is often said that whenever the furnace becomes red hot, and the air to be heated comes in contact with this red hot iron, "the air is burned up;" it is "dried out;" it "becomes dead;" it "loses its vitality," etc., etc.

The air is a mixture of oxygen and nitrogen. Which is "burned up?" Surely, not the oxygen, for that is not (in the ordinary sense of the word) combustible. It cannot be the nitrogen, for that unites with no substance, except with extreme difficulty and by indirect means. If the air is rendered "dry," where does the water go to? If moisture is in the air, it must either remain there, or be absorbed by some surrounding objects. But it is proverbial that all furniture is baked and becomes dry by furnace heat, and *equally so by steam heat*.

The truth is that whether the house be heated by steam or by furnace, the temperature is often raised to a much higher point than is necessary, and the higher the temperature the greater the capacity of the air to absorb moisture. The dry air, so called, therefore, is the consequence of *too much* heat, and has but little reference to the kind of heat.

It is not to be denied, however, that a change may be produced in the quality of the air for breathing, by *over heating* it. The healthfulness of the air,—in other words, its adaptation to its proper use in breathing, depends upon certain minor conditions, extremely difficult to explain.

Why is the dry air of Minnesota better for consumptives than the atmosphere of New England? Why are certain classes of invalids benefited by a protracted visit to Florida? Why are some asthmatic patients freer from their difficulty of breathing near the seashore, while others are better inland, and can scarcely live at the coast?

It is very probable that by superheating the air, its ozonic and electric conditions are so changed as to interfere somewhat with its best adaptation to the needs of the lungs. But it is confidently claimed that with furnaces of sufficient size, properly taken care of, and regulated, so as to avoid this extreme temperature, the difficulty may ordinarily, in nearly all temperatures to which we are liable in this

climate, be avoided, or so reduced to a minimum, as not to be of serious consequence, and probably so as to prove quite as little injurious as steam heat, especially when other circumstances are taken into the account.

On the other hand, it is without question that furnace heat is more reliable, both in extremely cold weather, and in mild weather, in relation to quantity. On very cold mornings, it is often with the utmost difficulty that large rooms can be heated to a proper temperature by 9 o'clock, with the ordinary steam heating apparatus. On the other hand, it is within my own personal knowledge, that there is no difficulty in securing an atmosphere in such rooms, of 68° or 70° Fahrenheit, at that hour by properly regulated furnaces.

Again, on warm days, when less heat is needed, it is far easier and simpler to secure the small quantity of heat required, by hot air furnaces, than by the steam method. Steam cannot be formed without heating the water to the boiling point, 212°, which gives more heat than is needed, but with a furnace the fire may be left to smoulder and it will last often for days, without any replenishing, giving off what little heat is required, and so furnishing a steady, uniform, proper temperature.

It is important in heating by furnaces, to have *good* furnaces, properly constructed, and properly managed. Many furnaces fail of producing satisfactory results because *the cold air boxes are too small*. There must be a full supply of pure air if good results are expected.

Then in regard to economy. In a New England city stands a school house, built a few years ago, containing about 150,000 cubic feet to be heated. It has the most approved system of steam heating by *indirect* radiation. I have been informed that two hundred tons of coal are used each year to heat this building.

In another city stands a school house, built about the same time, containing about 300,000 cubic feet. It is heated by five large furnaces, which have consumed only eighty-five tons of coal, each year for the last five years, and there has never been a morning but once, when the air has not been sufficiently warm in all the rooms at 9 o'clock, and that was on account of the draft having been left open, so that from the wind rising suddenly and blowing severely in the night, the fires went out, and the building was found in the morning with no fires in the furnaces. Yet by new fires the rooms were quite comfortably warm by 9 o'clock, and had sufficient heat by 10 o'clock.

III.—SUPPLY OF PURE AIR.

By means of these furnaces, the air is ordinarily taken from out doors, and a constant supply is poured into the rooms.

If, however the steam heaters are used, the method of indirect radiation only should be employed, which furnishes the same supply of fresh air. In *no case* should direct radiation be used unless there is by some means a constant supply of fresh air kept up. The impure air cannot be forced out, unless there is a supply to take its place.

IV.—PLACE OF PIPES FOR PURE AIR.

It is better that the hot air pipes should lead up into the rooms to be heated, next the outer walls of the house, inasmuch as by this means the heated air poured into the room will be carried by natural currents to the opposite side, and in this way an equality of temperature will be produced, through all parts of the room.

V.—PLACE OF PIPES FOR IMPURE AIR.

The ventiducts should then be placed on the opposite side of the room from the hot air pipes and neither should be near the teacher's platform. This plan will then ensure a general circulation of air throughout the room, and an equality of temperature.

VI.—CHARACTER AND ARRANGEMENT OF VENTIDUCTS.

1. These pipes to carry away the foul air, should be placed in the wall of the room, and should *in all cases be perpendicular*, never horizontal in any part, but, proceeding vertically from the side of the room, pass out through the roof ending in some approved ventilating cap.

2. These pipes should each communicate with only one room. In no case should two or more rooms, whether on the same or different floors, communicate with the same ventiduct.

3. These ducts should be round, and as *smooth* as may be upon the inside. A round pipe, whether to admit pure air, or to carry away the impure air, will carry a vastly greater quantity than a square one of the same surface capacity.

Besides, a pipe with a smooth surface,—and the best that I have seen have been lined with tin— will conduct rapidly a column of air through it, but a pipe with a rough interior is generally of no value whatever, since it is utterly impossible to force a current of air through it.

VII.—SIZE OF THE VENTIDUCTS.

Upon no point is there a greater diversity of opinion and of practice than in reference to the size of the pipes or ducts necessary to carry off the foul air. It was formerly thought that a small brick flue eight inches square placed in the wall of a building with a register of equal size opening into the room, was sufficient to ventilate perfectly a large school-room.

A fine building was erected ten or fifteen years ago for one of the most noted schools of New England, in the walls of which (the house being built of brick) were placed two such flues as described above to each large room. These flues not pargeted and left smooth within, but with rough and jagged sides, it was supposed would be ample to carry off the foul air produced by fifty or a hundred pupils.

On the other hand, in some cities may now be found huge ventilating shafts from three to five feet square, with openings into the rooms eighteen inches wide and three or three and a half feet long. Such a shaft running up between two rooms would communicate with both, on each of three or four stories, thus acting as the duct for foul air from six or eight large school rooms. Of course, it requires no argument to show that great quantities of heated air would be carried off in cold weather, when less ventilation was needed, and in mild weather the operation would be greatly diminished.

The old adage, "Large bodies move slowly," is as applicable to *air* as to solids. Is it not easy to see therefore that there must be certain dimensions for an air duct, as well as for a smoke flue, which will carry off a greater quantity of air or smoke, than a larger or a smaller pipe?

The fact is, in cold weather, when there is a great difference between the temperature within and without, the pressure of the atmosphere will give sufficient power to drive a great quantity of air through a large shaft, while in mild weather, it will require considerable *power* to create and keep in motion a draft through such a pipe. Then if several rooms, especially if they are upon different floors, open into one shaft, it will often happen that there will be a draft *out of* one room, and *into* another.

Frequently, another difficulty is experienced by having several rooms open into one duct, by reason of the communication of sound from one room to another, so that the exercises in one will be heard in another.

I have found that a round tin-lined pipe of twelve or fifteen inches

in diameter has proved quite as satisfactory as any, to carry off the foul air from a room 40x30 with from forty to fifty pupils.

VIII—POWER TO BE USED IN VENTILATION.

Every one knows that any one of various plans will show good results in *cold weather*, but will be of less service in warm, cloudy, or stormy weather.

There is no system that has ever fallen under my observation which works well in all weathers, and at all temperatures without the aid of *power* to carry off the foul air.

In cold weather, with large quantities of fresh air poured into the rooms from the furnace or steam heater, the air will be forced out at almost any kind of a duct. But in mild, heavy weather, sometimes called “muggy,” some *power* is absolutely necessary to produce a current from the room. Various methods have been devised and put into operation to effect this object; for example, whirligigs upon the top of the ventiducts, an iron smoke stack in the center of the shaft, a coil of steam pipe at the bottom of the duct, or a small gas stove within.

Some method of this kind is absolutely necessary to good success in ventilating at all temperatures. I have found the most excellent results from a small gas stove or heater, placed in the bottom of the duct. It requires only the quantity of gas consumed by a single, ordinary, burner, for lighting purposes. The gas, after being thoroughly mingled with the atmospheric air, is passed through wire gauze, and burned above this netting.

OPENINGS—TOP OR BOTTOM?

Diverse opinions have prevailed also, in relation to the place for withdrawing the foul air. Shall the openings in the ventiducts be near the top or bottom of the room?

Bearing in mind that the poisonous gases are thoroughly diffused throughout the room, and that the tendency of heated air is to rise, and that the ducts are vertical for the *purpose* of carrying off these impurities, it would seem that no one *ought* to question the position that the greater part of the foul air to be taken off, would be best carried away from the upper part of the room.

The most satisfactory results will without doubt follow, where large registers are arranged both at the top and the bottom of the room. After the rooms are properly aired in the afternoon, the upper registers may be closed till next morning at 9 o'clock, and then opened.

It has been my practice to let the lower registers stand open at all times, and the upper ones, during school hours.

Let me add a word or two of caution. Do not think that a plan which appears to give good results in one case is the only proper plan in the world, or that it will do equally well in other places. Do not elaborate any pet theory, and settle down into the belief that this plan is perfect and all others are fallacious and useless.

Do not depend upon any one plan alone. Whatever general method you adopt, supplement it by all other means in your power. The air is a very treacherous element, the most difficult of all to harness and control. It is necessary, therefore, to use all possible aids and appliances to accomplish the purpose.

One of the best illustrations of what is here meant, may be stated as follows:

After arranging for the reception, through pipes and registers, in the school-rooms, of an abundant supply of fresh heated air, and for the carrying off of the impure, vitiated air by ventiducts, then heat the corridors, passage-ways and entries, and leave all doors open into these corridors from the school-rooms, and thereby permit a general circulation of air from the several rooms to the corridors. In addition, it will facilitate very much, if hot air be poured into these corridors at the foot of the lower stair-cases, and a large ventilating pipe pass out through the roof, from the upper hall of these corridors and passage-ways. By these means, a draft throughout the building is promoted, and that without the deleterious effects always produced by opening windows and allowing a draught of air to blow directly upon the heads of the pupils.

The above comprehends, in substance, such observations as have grown out of my own study and experience. I am well aware that the discussion is by no means exhaustive, but as stated at the outset, such discussion would be neither possible or desirable.

With the hope that those who have the matter in charge, in our various towns and cities, will unite in doing all possible to spread, so far as ascertained, the knowledge of the true principles of ventilation, so that at no distant day, bad or defective ventilation of school houses will rarely, if ever, be found in our State,

I am, dear sir, very respectfully yours,

WILLIAM A. MOWRY,

English and Classical School, 49 Snow Street.

PROVIDENCE, January 1, 1880.

SEWERAGE OF THE DWELLING,

BY

ORVILLE FISHER,

CIVIL AND SANITARY ENGINEER,

PROVIDENCE, R. I.,

SEWERAGE OF THE DWELLING.

The sewerage of the dwelling is such an important branch of the system of general sewerage of a city, or town, that upon the skill and care exercised in carrying it out, depends much of the safety and utility of the general system.

It is not enough that we provide means for the removal of the liquid refuse from the dwelling, but it is quite as essential that we protect the dwelling against the entrance of sewer air, which may through faulty connecting sewers, enter the dwelling and exert its malarious influence upon the occupants.

A system of house-sewers that does not completely and rapidly remove all liquid refuse and fæcal matters, and at the same time prevent the escape of sewer air into the dwelling, must be considered unsafe and imperfect.

Every owner and occupant of a dwelling should so far investigate and make himself familiar with the subject of house-sewerage, as to understand and appreciate some of the dangers that accompany a neglect to have the sanitary arrangements of the dwelling planned and executed in a thorough and workmanlike manner, also that these arrangements require constant care and frequent examination, to ensure that they remain in condition to fully and safely do the work required of them.

Unfortunately, the majority of persons do not take sufficient interest in the sanitary arrangements of their dwellings, either to examine into their condition themselves, or to employ a competent person to do so for them. In general, nothing is done in the way of an examination of the sanitary arrangements of the dwelling, so long as there is no disagreeable or positive odor emitted from them; or until sickness and death occur among the occupants, of a nature that leaves little doubt that the origin and cause of such sickness and death, is to be

found in the poisonous gases that have found entrance through the defects in the house-sewers and their connections.

As the public sewers are intended to collect, concentrate and carry away the liquid refuse and fæcal matters of the city or town, and as these matters often are the source of contagious diseases, we cannot be too careful in making proper connections between them and our dwellings. The necessity of such care will be better appreciated, when it is remembered that the public sewers are often poorly ventilated, and sometimes not at all, and that accumulated gases become so foul in them, that the workmen are often obliged to wait until the gases escape upon removing the man-hole covers, before they can enter. Especially is this the case in winter, when the man-hole covers, which are usually perforated with holes to provide ventilation for the sewers, become frozen down and closed with ice and snow, and when the increased warmth of the dwelling has an extra tendency to draw the sewer-air, through its connecting sewer into the dwelling.

The following "Requirements for the Drainage of every House," which appeared in "The Plumber and Sanitary Engineer," September 1st, 1879, covers the subject so well and completely, that I think it best to repeat them here.

They are requirements which cannot be too well known, nor too fully complied with by every house owner.

"Every house-drain should have an inlet for fresh air entering at a point inside the main trap, and carried to a convenient location *out-of-doors*, not too near windows.

"A trap should be placed upon every main drain to disconnect the house from the sewer or cesspool. In places liable to unusual pressure from the sewer, it should be a double trap, with vent from between the two traps, running up full size above the roof; or, where the pressure from the sewer is only occasional, and the rigor of the climate will permit, this vent may be carried to the sidewalk or area, at a safe distance from the windows. If the first trap is forced the gas can gain easier exit through this pipe than through the second trap.

"Every vertical soil or waste pipe should be extended at least full size through the roof.

"No traps should be placed at the foot of vertical soil pipes to impede circulation.

"Traps should be placed under all sinks, basins, baths, wash-trays, water-closets, etc., and as near to these fixtures as practicable.

“ All traps under fixtures, wherever practicable, should be separately ventilated in order to guard against syphonage. Such vent pipes should not branch into a soil pipe below where any drainage enters it. In some cases it is preferable to carry it to outer air independently.

“ Rain-water leaders should not be used as soil pipes, and when connected with house-drains they should be made of cast iron in preference to galvanized sheet iron or tin, there being less liability of corrosion. Joints should be gas and water-tight, to preclude possibility of drain air entering open windows.

“ No safe waste should connect with any drain, but it should be carried down independently to a point where its discharge would indicate the existence of a leak or any overflow above.

“ No waste from a refrigerator should be connected with a drain.

“ Unless the water supply is ample, so that it will rise to every part of a building, ensuring at all times the proper flushing of fixtures and traps, a cistern should be provided into which the water will rise at night, or into which it may be pumped. Said cistern should be large enough to hold an ample daily supply, be kept clean, covered, and properly ventilated. The overflow pipe from it should *never* be run into any drain *under any circumstances*. The supply for drinking-water should not be drawn from it, but from a direct supply, *i. e.*, direct from the street main.

“ Water-closets should not be supplied directly from street pressure or by a pipe from which branches are taken for drinking water. Where the valve closets are preferred to those that are supplied from a small cistern immediately over them, then the supply should be taken to a storage tank, from which it can be conveyed to the valves on the closets, thereby ensuring an equable pressure and securing more reliability in their working.

“ All drain pipes within a house should be of *metal* in preference to stoneware, owing to the liability of the latter to crack and the difficulty of keeping the joints tight. It is best to run them along the cellar wall or ceiling with a good incline. They should *never* be hidden underground, as then leaks will not be perceptible. In some places it is common to paint pipes white so that any leakage will show itself to the most careless observer.

“ All drains should be kept at all times free from deposit; and if this cannot be effected without flushing, special flushing arrangements should be provided so as to effectually remove all foul matter from the house drains to the public sewers.

"All drains should be laid in a straight line, with proper falls, and should be carefully jointed and made water-tight. No right-angled junction should be allowed, except in the case of a drain discharging into a vertical shaft.

"No drain should be constructed so as to pass under a dwelling house, except where absolutely necessary; and then it should be constructed of cast iron pipes, with lead caulked joints laid so as to be readily accessible for inspection, and ventilated at each end.

"Whenever dampness of site exists it should be remedied by laying subsoil drains, which should not pass directly to the sewer, but should have a suitable break or disconnection.

"Water supply and drain pipes should be concentrated as much as possible, and not scattered about a building. Horizontal pipes are objectionable.

"Plumbing fixtures should not be hidden behind walls and partitions where their condition is never apparent. They ought properly to be open to view and so situated that any leak would be readily detected. It is also well to have a plan of the plumbing of each house for the tenant's or owner's convenience and guidance in any emergency.

"In planning house drains they should be got outside the walls of the house as quickly as possible, so that there may be few joints of pipe, and the smallest chance of leakage from defects or accidents: taking proper precautions in locating to guard against freezing."

Mr. Edw. S. Philbrick in an article on "Domestic Sanitation," which appeared in an issue of the above mentioned paper for August 15th, 1879, makes the following valuable remarks and suggestions upon the construction and abuse of urinals and water-closets:

"Of all the fixtures set up by plumbers, the most troublesome and the most difficult to keep clean are the urinals. No wooden material should ever be allowed about them within spattering distance. The surfaces exposed should be smooth and absolutely impervious to water. Glass or thoroughly glazed porcelain is of course the best, but slate well smoothed is a very good surface. Lead is soon encrusted with a film of oxide, which contributes to the accumulation of filth, while brick is as bad as wood, if not worse. The floors under and about the urinals are often very offensive, even where the fixture is well flushed and clean. A perfectly satisfactory material is yet to be found for such floors. Even tiles have joints which are slightly absorbent while sheet lead is soon roughened by oxidation and liable to crack and

hoard up the nastiness beneath. Glazed tiles laid in Portland cement are perhaps as good as anything. But whatever the material may be, nothing but frequent and thorough washing will keep such places from becoming an offense. The fewer they are in number inside of a house the better for the inmates, provided always that they are not entirely omitted in some form or other, and are made of such ready access as to meet the actual wants of the family. There should be every possible facility afforded for cleanliness at such places, by supplying water freely, and no end of vigilance must be used to enforce such cleanliness.

“The reckless abuse of water-closets by men and boys when using them as urinals is one of the most disgusting items encountered in the proper management of the household. This is a matter of personal purity, and should be considered and taught by every father to his son. Of course, this evil is much aggravated by the improper wooden casings usually applied. Lead safes surrounding the seats may be better than none, but enamelled iron is very much better.

“It would be better yet to dispense with all wood-work whatever and use nothing but glazed and impervious surfaces, if such could be made consistent with comfort. This may be done in warm climates and certainly should be.”

In laying the house-sewer too much care cannot be taken to secure air and water-tight joints. They should resist alike the escape of the sewerage into the surrounding soil, the entrance of subsoil water, and the minute rootlets of trees and plants, which in search of moisture seek out and force themselves through the smallest apertures in drains and sewers, thus causing the sediment to collect, and finally choke up the sewer.

The course of the communicating sewer should be a straight line if possible, and where one straight line cannot be adopted, there should be straight lines from angle to angle, with inspecting and ventilating shafts at the angles. These shafts should be so arranged, that they can be used for flushing the sewer when required.

The inclination should be regular and continuous, and sufficient to ensure a velocity that will keep the pipes at all times free from deposits.

A velocity of from three (3) to ten (10) feet per second will generally prevent accumulation of sediment in house-sewers, which vary in size from three (3) to nine (9) inches in diameter.

The following table, (taken from J. Bailey Denton's Sanitary En-

gineering, page 67,) gives the velocity and discharge of sewers of different sizes, laid with different inclinations, when running full:

Diameter of pipe.	180 ft. per minute. 8 ft per second.	270 ft. per minute. 4½ ft. per second.	360 ft per minute. 6 ft. per second.	540 ft. per minute. 9 ft. per second.				
Inches.	Fall.	Gallons per minute.	Fall.	Gallons per minute.	Fall.	Gallons per minute.	Fall.	Gallons per minute.
3	1 in 69	54	1 in 30.4	81.0	1 in 17.2	108	1 in 7.6	162
4	1 in 92	96	1 in 40.8	144.0	1 in 23.0	192	1 in 10.2	288
6	1 in 138	216	1 in 61.2	324.0	1 in 34.5	432	1 in 15.8	648
9	1 in 207	495	1 in 92.0	742.5	1 in 51.7	990	1 in 23.0	1485

Mr. Denton says: "In applying the table practically, reference should of course be had to the maximum rate of outflow which may take place at any time of the day. It will be observed, that the number of gallons which the different pipes are capable of discharging in a minute, when running full at the different inclinations specified, will often exceed the total quantity of sewage to be discharged from a dwelling in the whole of the day, and yet it may be desirable to use a pipe with such excessive capabilities of discharge."

Where the house-sewer passes through the foundation walls, a relieving arch should be placed over the pipe, to prevent any settling of the building from destroying or misplacing it.

In order to ensure true position and stability for the pipe-sewers, they must have uniform support throughout their entire length. To secure this, where they are placed beneath the surface of the ground, the trench must be hollowed out to receive the joints. In treacherous and unstable soil, care must be taken to provide a good foundation to prevent the sinking of any of the pipes, which would destroy the regularity of the fall, and thus impair the utility of the sewer.

The junction of two sewers should be so arranged that the flow of the sewage in both will be as little impeded as possible. The connection should never be made so that the discharge from one sewer shall enter the other at right angles to its flow, but always at an acute angle. The smaller the angle the less will be the retardation of the flow, and the less liability of any deposit forming to choke up the sewer at the junction.

Curved junctions make the best connections. The larger the radius of the curve described by the entrance of the tributary sewer, the less impediment will be offered to the flow of the sewage in the main sewer.

Whenever it is necessary to use curves or angles in the pipes, it is well to give them greater inclination at such points, in order that the increased friction may be overcome. Especially should this be done where the house-sewer enters the public-sewer.

The velocity of the sewage from the tributary sewer, when it enters the main sewer, should at least be equal to the velocity of the sewage flowing in the main sewer.

A sewer should not be tributary to one of equal dimensions with itself, but should always have its discharge into one of larger dimensions: that is, a six-inch into a nine-inch, a nine-inch into a twelve-inch, rather than a six-inch into a six-inch, or a nine-inch into a nine-inch.

The inverts of the tributary sewers should be above, or at least on a level with the ordinary flow of the sewage in the main sewer. If they are below this, the smaller sewers will very likely become choked, owing to the sewage being backed up in them from the main sewer. The velocity of flow being thus stopped, the sediment is allowed to settle and collect.

It has not been the object of the foregoing article, to treat of the sanitary appliances of a modern dwelling in detail, but simply to again call attention to the very urgent necessity of exercising due care in the introduction of these appliances into our dwellings.

If these appliances are properly constructed and taken care of, they are a valuable acquisition to a dwelling. If they are faulty in construction and neglected, they may become very unpleasant if not dangerous.

· PROPER DISPOSITION

OF THE

EXCRETÆ OF THE INTESTINES AND KIDNEYS,

BY

ROBERT F. NOYES, M. D.,

PROVIDENCE, R. I.

PROPER DISPOSITION

OF THE

EXCRETÆ OF THE INTESTINES AND KIDNEYS.

In considering the proper disposition of urine and feces I shall waive the question of the *necessity* of their removal. It is not within the scope of this paper to point out the relation between poor hygienic surroundings on the one hand and specific diseases on the other. I consider the importance and necessity of the removal from our estates and immediate surroundings of the excretæ of the intestines and kidneys upon good and sufficient grounds settled, and although much which I shall say may be considered elementary, yet the importance of that which is common place should not be ignored in our zeal to grasp that which is more novel.

The amount of liquid and solid excrement of populous places may be approximately estimated.

Physiology teaches that six ounces of solid matter and two and a quarter pounds of urine are excreted by each adult every twenty-four hours.

By the census of 1875, the population of Providence was fixed at 100,675. Of this number 72,319 were more than 15 years of age. A simple mathematical calculation determines that there are by the adult population of this city 13.55+ tons of feces and 81.35+ tons of urine daily excreted. The exact amount of urine and feces excreted by children of different ages has not been accurately determined. It is well known that the amount of food required by the child and the amount of matter excreted is greater in proportion to the weight than that of the adult. Prof. Wm. B. Carpenter estimates the amount of urine excreted by children as nearly double in proportion to the weight of the body as that cast off by the adult.

By the census of 1875 it appears that the number of children between 10 and 15 years of age was 7997. Estimating that from each individual of this class there are two and a quarter pounds of urine and four ounces feces excreted every twenty-four hours, we have from this source 8.99+ tons of urine and 1999 $\frac{1}{4}$ pounds of feces as the daily amount.

The same census also shows that there were 9429 children between the ages of 5 and 10 years. Upon the basis that each of this class excretes one and a quarter pounds of urine and three ounces of feces daily, the amount is readily calculated at 5.89+ tons of urine and 1767.93+ pounds of feces as the average daily quantity.

In 1875 there were also in the city of Providence 4044 children between 3 and 5 years of age. Considering that by each one of this class there is one pound of urine and two ounces of feces daily excreted, we have 2.02 tons of urine and 505 $\frac{1}{4}$ pounds of feces as the total daily amount. The number of children in the city of Providence less than 3 years of age was 6876. Calculating that from each of this class two-thirds of a pound of urine and one and a half ounces of feces are daily excreted, we have 2.29+ tons of urine and 644 $\frac{3}{8}$ pounds of feces as the amount cast off in twenty-four hours.

A cursory examination of the above estimate shows that by the population of the city of Providence there are daily cast into privies, cesspools and sewers not far from 100.54+ tons of urine and 16 tons of feces.

In addition to this the excretæ of horses is not unimportant and is to be calculated. Estimating the number at 6000, which Dr. Fisher informs me is a fair estimate, and that from each fifteen pounds of feces and 30 pounds of urine are daily excreted, we have 135 tons per diem from this source alone. Thus not far from 91,812.1+ tons of excrement are cast upon the ground or are deposited in privies, cesspools, stables and sewers in this city annually. The above amount although apparently large is not in reality an exaggeration.

In the above estimate the amount excreted by the population of Providence has not been overestimated, and no account has been taken of the excretæ of the 3500 dogs nor of other domestic animals existing in the city. The exact proportion of this amount actually removed from the city through sewers, and carted away from privies and cesspools will vary, depending upon a variety of circumstances.

Much is lost by evaporation and absorption by the earth. The urea, of which one ounce may be considered as the average daily

quantity excreted by the adult, is frequently, by the presence of a catalytic body caused to unite with water, when carbonate ammonia results, much of which because of its volatility is lost.

The question of the removal of these matters from populous places, is of prime importance and has long engaged the attention of sanitarians. They have endeavored to remove these excretæ and still appropriate them to fertilization.

Some maintain that the pneumatic system of sewerage is preferable to all others. Others advocate cremation. Some recommend the use of dry earth, while others claim that sewers or underground channels are the best method.

The fluidity of much of the excretæ precludes the practicability of cremation. The dry-earth system consists of the immediate application to excrement of dry pulverized loam, and the removal of the whole at short intervals to lands requiring fertilization.

In the application of this method it is important that the loam be thoroughly dried and pulverized. It is also essential that the earth closet or apparatus intended for indoor use should be carefully managed. The amount of loam applied to the excretæ should not be small, its application should be immediate and the whole should at short intervals be removed from the dwelling.

This method, when carefully employed, has achieved good results in hospitals, barracks and school houses. The liability of the apparatus, however, to become imperfect by use and the amount and nature of the earth required have rendered this system impracticable in densely populated districts.

In rural districts the application of loam or ashes to excrement is to be recommended as a simple, cheap and efficient method.

By the pneumatic system, iron receptacles of sufficient size are placed under the pavements of all principal street crossings. Running into the iron reservoir are a number of small pipes communicating with the privies in the immediate vicinity, without the intervention of cesspools. Each pipe is provided with a valve which may be worked from the street. The privy contents are first forced into the receptacles, then removed and carried away in the following manner: A steam engine appears at a given street-crossing and exhausts the air from the reservoir and iron pipes as far as the valve already mentioned. These are now opened and suddenly, by atmospheric pressure, the contents of the privies and pipes are forced into the receptacles. By pneumatic pressure these are now emptied and the contents carried away in hermetically closed wagons.

Sewers are by no means of recent origin. Before the microscope, before the discovery of bacteriæ and vibriones and long before the germ theory of disease had engaged the attention of science, the ancients well understood the importance of cleanliness. The public baths of Continental Europe, the Cloacæ of Rome, their size and their systematic flooding, all attest the sanitary knowledge of the Romans.

Underground channels, however, are not always constructed for the removal of excretæ. The sewers of Paris convey surface water only. Cesspools upon a gigantic scale abound, the contents of which are carted away from the city and used in fertilization.

Formerly, in England, it was a punishable offense to allow cesspool matter to enter the sewers, and it was as late as 1847 that the first act was passed requiring private drains to enter public sewers.

The water-carriage system is at the present day considered the most efficient mode, and is to a greater extent by far employed than all others. Sewers for the carriage of surface water, excretæ and cesspool matter should be as far as possible self-cleansing. The size, the shape, the internal surface and the inclination of the sewer are all very important. The size is one of great importance; if too large the matters flow on too slowly, if too small the matters fail to enter. This importance is appreciated by engineers who tax themselves greatly to solve this question in the laying of every sewer. Sewers, other things being equal, are efficient in proportion as their size, shape and inclination are adapted for the rapid transit of their contents. The bottom of sewers should not be flat, their internal surface should be smooth, and as all sewers or all parts of the same sewer cannot be perfectly self-cleansing, they should be systematically flooded. The flooding of sewers implies in their construction the introduction of valves or gates by which the sewer may be divided into sections.

The old sewers of Providence were few, they were large, their bottoms were of flag stone or boards and their sides were of rough stone without the use of cement. They were intended for surface drainage only, and the connection of cesspools and privy vaults was a perversion of their intended use. They opened at tide-water or into the Moshassuck river and benefited from 1500 to 2000 people.

The size of the new sewers is based upon the supposition that 30½ feet per acre per minute may be required to be conveyed, and that without entirely filling the sewer. The smaller sewers are vitrified

pipe, and are cylindrical. The larger are constructed of brick and vary as to shape, some being cylindrical, while others are egg-shaped. The smallest sewer is eight inches in diameter; the largest is 66x72 inches. Upon the shape of the sewer is dependent, to a certain extent, the amount of sewage requiring artificial removal. It is obvious that less sediment will be deposited upon a bottom smooth and egg-shaped, than upon one rough and flat.

A storm sewer has been constructed in Washington street. This is circular, is constructed of brick, and is intended for surface drainage only.

Man-holes with perforated covers are placed in most of the sewers, at a distance of one hundred feet.

There are 42.96 miles of sewers in this city, and 2,772 sewer connections. There are twenty-one openings or outlets; fourteen at tide water, six into the Moshassuck, and one into the Seekonk. Not more than 18,000 people are at present benefited, although double that number could be by connecting their estates. The only provision for ventilation is the perforated covers of the man-holes.

The sewers of this city are, to a very great extent, self-cleansing. They cannot be flooded; they can only be washed or cleansed, which is done semi-annually, at such times as deemed necessary by the Water Commissioners and the city engineer.

Aside from the accumulation of sewage in the "dead ends,"—by which is meant that portion of the beginning of a sewer above the first catch-basin—very little sewage is found requiring artificial removal. During the past year, $6\frac{1}{4}$ miles of sewers were cleaned and forty-seven cubic yards of sewage removed.

The bottom of the opening of the sewer, at tide water, is placed one foot above mean low water mark. Twice, then, during twenty-four hours, may sewage find a free exit, but during the flooding of the tide, this exit is impeded and tide water flows at distances varying from 275 feet in the Brook street sewer to 4,024 feet in the sewer of Dorrance street. There are 1,724 catch-basins in this city, which receive surface water, excretæ of houses, sand and various other matters which are promiscuously thrown into the street. The cleansing of these receptacles demands close attention; if it is neglected, they become centres of filth with a free communication with the street. During the seasons of small rain fall, evaporation of the water is frequently sufficient to open the trap, and then a free communication between the street and the sewer is established. This condition is closely

guarded against by the Board of Water Commissioners, and city engineer, aided by the police. Each catch-basin is examined monthly. If the trap is insufficient, fresh water is introduced; if the sediment is one foot deep, the basin is thoroughly cleansed, and water from the hydrant introduced. During the past year, 6,257 catch-basins were cleansed and 4,395 cubic yards of deposit removed.

The mode of connecting estates with the sewer, and the manner of plumbing houses must be well considered by those who would be benefited rather than injured by the conveniences of a sewerage system. In this matter I believe there is much indifference, and too frequently dangers are encountered and baneful results reaped, instead of the security and blessings possible and intended by the underground receptacles and channels. The security from sewer gas is mainly and justly placed in traps. These, to be efficient then, must be arranged with reference to pneumatic and hydrostatic laws. A trap, in general terms, may be defined as a mechanical arrangement of some portion of the pipe, which shall always be filled with water. The principle in all traps is the same. The water acts as a seal, and intercepts poisons from cess-pools and sewers. The mechanism of traps will vary, depending upon the inventor. Of the traps in general use in this city, the Cudell, is, perhaps, worthy of special notice. In this trap, the water escaping from the sink enters the bottom of a cup which contains a tin ball. The cup is filled, is overflowed; the surplus water passes on through the water pipe, and the ball sinks to the bottom of the cup, preventing the escape of the water, and thus establishing the seal.

In the box trap, the water enters near the bottom and escapes near the top of the box. Bowers' trap and the bottle trap are occasionally used, but possess no advantage over those already described.

The S trap, with complete ventilation, (to be described on a subsequent page,) is, perhaps, the most efficient of all. The S trap, without ventilation, is, to a greater extent employed than all others. Traps of whatever form should frequently be examined and all particles of matter found in them removed. This examination should have reference, not only to cleanliness, but to the efficiency of the trap, as well. It is sometimes found that traps which have been in use a number of years, have become so thoroughly destroyed by elements which have passed through and which have been retained in them, as to allow gas to escape through the walls of the pipe. They become honey-combed and are sources of danger.

By an ordinance of the city, it is required that every drain shall be laid, and every sewer connection shall be made under the guidance of a licensed drain layer. It is also required that every drain, before entering the sewer shall be trapped, that the drain shall be continued to the top of the house, or be made to enter a flue, and that there shall be a down spout communicating with the drain back of the trap. Drain layers obtain their licenses from the Board of Water Commissioners, and are required to give bonds. The S trap is universally used in the drain.

Experiments readily determine that this required trap may either be emptied, or sewer gas may be forced through it. It will be emptied when the sewer is full, or its contents so great as to flow above the opening of the drain. Sewer gas will be forced through the trap when, from some obstruction, the contents of the sewer are unable to escape. The falling of a large quantity of rain, in a short time, rapidly fills the sewer, while the flooding of the tide prevents the free egress of the sewage material. Thus, at times, the trap becomes inefficient. If it is emptied the sewer is ventilated into the drain, which is by law continued to the top of the house, or is made to enter a flue. The drain also has free communication with the down spout or water conductor. The direction of gases in the drain will much depend upon the temperature of the air in its continuations, the current being in the direction of the heated air. In a climate as variable as ours, it is obvious that the direction of the current will not be continuous. During the cold portions of the year, the gas will escape principally at the top of the house; during the hot season the current will be through the water conductor, while during other portions of the year the currents will vacillate, depending upon the diurnal and nocturnal variations.

The continuation of the drain should be of large size, its top should invariably be open, and it should be conducted to the highest practical point. The practice of entering the kitchen flue, is, I believe, poor. It is true, during the cold portions of the year, the heat of the chimney will produce free ventilation, and cause the noxious gases to escape at the top, but during the warm portions, when the furnace is no longer required, when the use of the gas stove becomes general, and when the currents vacillate, the danger of ventilating the sewer into the house through the chimney is not to be lightly considered. It has of late been recommended to conduct the pipe inside the chimney to its top. This, it seems to me, is an excellent method. In winter,

free ventilation is insured; in summer, the residences escape from this source the danger of sewer gas. M. Carey Lea, Esq., of Philadelphia, recommends that a flat stone be laid upon the top of the chimney, with openings upon the sides for the escape of smoke. This in no way interferes with the draught of the flue, while the possibility of the entrance of sewer gas is made very small. In this connection it may be observed that the relation of the top of the chimney and the windows of observatories is such that the contaminated air will be blown into the latter. The dangers from this source are slight. The currents at this elevation are strong, and the cupola is only an occasionally inhabited portion of the mansion. Moreover, it is obvious that the danger from this source can be no greater by carrying the pipe to the top of the chimney, than by entering the kitchen flue, while the liability of the escape of sewer gas through fire-places and openings into the flue is reduced to a minimum. It may be urged that water conductors act as ventilators to drains, and that the mode employed and recommended is not required. It is true water conductors ventilate drains, and with the inefficient trap already described, a direct communication with the sewer is established. The perfection of this mode of ventilation, however, is inferior to that already considered, and, moreover, the difference in the height of houses in cities renders this mode still more objectionable. For the height of buildings of one estate may be such that the gas escaping through water conductors will be wafted directly into the windows of an adjoining estate, or into those of other buildings of the same estate. Water conductors, also, frequently composed of wood, allow of the escape of sewer gas at various points, and the open windows of successive stories admit the impure air to sleeping apartments. Water conductors should not connect with the drain.

The inefficiency of the trap required by law, the mephitic gases of the drain incident to the conveyance of its own contents, and the uncertainty of the direction of the currents, render other preventive means imperative. This security is sought by traps placed immediately beneath water-closets, sinks, set bowls, &c. The large size and open top of the main already advised are essential, not only for ventilation, but without these precautions nothing can be gained by the additional system of traps.

If the main be small and sealed at the top, the escape of water from an upper tenement will empty the traps in a lower, and the escape of water from a lower tenement will empty the traps in an upper.

If the pipe be small and open at the top, the escape of water from an upper tenement will open the traps of a lower. If the main be large and open at the top, these dangers are avoided, unless by a combination of circumstances a number of pipes in an upper tenement should be suddenly opened, sufficient to fill the main pipe. In this event, the traps in the lower tenement would, of course be opened. This possible danger may be avoided by ventilating the trap. A ventilator should pass from just below the trap, and enter the main above all other connections, or be conducted to the top of the house, at the option of the owner.

The inefficiency of the trap regulated by law may in the judgment, of the writer, be remedied by a double trap with a ventilator between. In this event whenever the trap nearer the sewer is emptied, the other trap is by the ventilator protected, and in case of regurgitation of sewer gas through the first trap the ventilator will protect the second.

As already intimated, about one-fifth of the population of this city is, and a little more than one-third could be, benefitted by the sewerage system.

For the large majority, therefore, privies and cesspools must answer the demand. The city ordinance requires that every privy vault shall at least be emptied once in each year, and that between December 1 and May 1. It also provides for the removal of such contents during other portions of the year, if permission be obtained of the Superintendent of Health, and by the same ordinance thorough disinfection of privy contents is required. There is no such provision for the emptying and cleansing of cesspools. A cesspool may indeed be emptied and cleansed at the discretion of the owner at such times as permitted by law or whenever permission may be obtained from the Superintendent of Health. Should a cesspool become a nuisance and deemed by the Superintendent of Health dangerous to the public health, the Board of Aldermen may order such a receptacle emptied and cleansed.

These ordinances are much more noted for their breach than for their observance.

The fact is, people are indifferent to such matters. Complaints are not made to the proper authorities and great masses of animal matter exist all over the city putrefying and producing the baneful results incident to such putrefaction.

There is no law regulating the mode of the construction or the materials to be used in the making of privy vaults. The idea and inclina-

tion of each is a law unto himself. Frequently these vaults are not impervious to fluids and the soil in the immediate vicinity is saturated with the excretæ of the intestines and kidneys. Wells in the vicinity are of course contaminated. If the distance is short the evidence of the communication is apparent to our senses; if the space is greater, the chemist is satisfied nevertheless that privy contents have leached into the well.

Percolation through the soil may remove coloring matter, matters suspended, and odoriferous emanations but matters in solution pass on. If the distance is short and the soil becomes thoroughly saturated, the atmosphere in our cellars becomes contaminated, and now added to other dangers, is that of poisoned air within our dwellings.

Privy vaults should be cemented or made of some material impervious to fluids. They should not receive surface drainage; the ordinance regulating their emptying and cleansing should be rigidly enforced and they should be frequently and thoroughly disinfected.

The importance of disinfection should not be overestimated, and the mistake of depending upon disinfection to the exclusion of cleanliness must not be committed. A gallon or two of a solution of carbolic acid or a few pounds of chloride of lime cannot destroy the poisonous properties of barrels or hogsheads of putrefying privy contents. Neither can immunity from these dangers always be assured by the absence of unpleasant odoriferous emanations or by the substitution of one odor for another. Frequently, with that which is offensive to the olfactory sense, poisonous odorless gases exist.

Cesspools are an abomination and their abolition should be as speedy as possible. Legislation is required compelling the connection of all estates with the sewer when practical and the doing away with all cesspools upon such estates.

The option of the owner governs in the constructions of cesspools. Sometimes a barrel is placed in the ground into which pipes terminate. Sometimes the excavation is loosely covered with boards and sometimes the sides are made of loose stones without the use of cement. Into these receptacles a large amount of matter enters, the fluids percolate the soil, the semi-solids are caught and retained in the interstices, putrefaction ensues and gases incident thereto result. Cesspools should be removed as far as possible from dwellings and wells and their coverings should prevent the escape of gases.

Pipes of all sizes and composed of different materials are used in the connection of estates with cesspools. Frequently the owner

deems himself sufficiently versed in the science and art of plumbing to make the required connection, without the expense of a plumber. Wooden pipes, many times too large, are used which soon become inefficient and allow the fluids to escape before they reach the cesspool. I have known of iron and gas pipes of various sizes to be employed, the smaller fitting into the larger without any regard to tight joints, and all laid at such an angle that regurgitation sometimes occurred, when the sides and bottom of the cellar were saturated with cesspool matter. It is obvious that this is wrong, and the remedy is plain enough.

Cess-pools should be ventilated. This is almost never done. Indeed, when it is, a wooden pipe is frequently conducted from the cesspool outside the house as far as the windows of the second story. Wooden pipes are unsuitable, they easily become imperfect and gases escape which find entrance through the windows in the vicinity.

The ventilators should be perfect and they should be conducted to the top of the house. Traps, then, should be placed immediately under every sink, wash-basin, set-bowls, &c., and the syphonage or emptying of these rigidly watched and prevented by the means already described.

Tenement houses in various portions of the city are very often unprovided with any trap whatever and the gases from the cesspool find free circulation in all parts of these dwellings. Here the inhabitants live frequently in a location unhealthy by nature but rendered one hundred times more so by the mephitic gases which they in their ignorance respire with all the freedom of the purer air of good hygienic surroundings, or indeed, should the emanations become unbearable, disinfectants are brought into requisition, frequently enough with no good, save the substitution of one odor for another. The land-holders too are indifferent, and actuated sometimes by ignorance and sometimes by penuriousness, refuse the proper remedies and argue at length with the sanitarian.

Legislation is required that these houses, occupied by the ignorant and poor, should be properly connected with cesspools and every owner should be held to a strict account for every neglect in this particular. In a matter involving public health, no man should be arbitrary and have a right to say what shall and what shall not be done on his particular piece of property. In such matters intelligent legislation should rule. Through the imperfect sewer and cesspool connections also, the dwellings of those better-to-do and the mansions

of the rich are not always free from the gases in question. If the quantity is not as great, still insidiously may the poisonous odorless emanations enter; and frequently, after the prevalence of zymotic diseases, it is, that the plumber first discovers that some portion of the dwelling is contaminated with the sewer gas.

In recapitulation, allow me to suggest that the remedies for the present imperfect sewer connections are as follows :

First.—Place two traps in the drain, with a ventilator between, which shall be continued to and above the roof.

Second.—Never connect a water conductor with the drain.

Third.—Continue the drain of large size to the highest practical point. The mode of continuing it inside the chimney to its top is excellent.

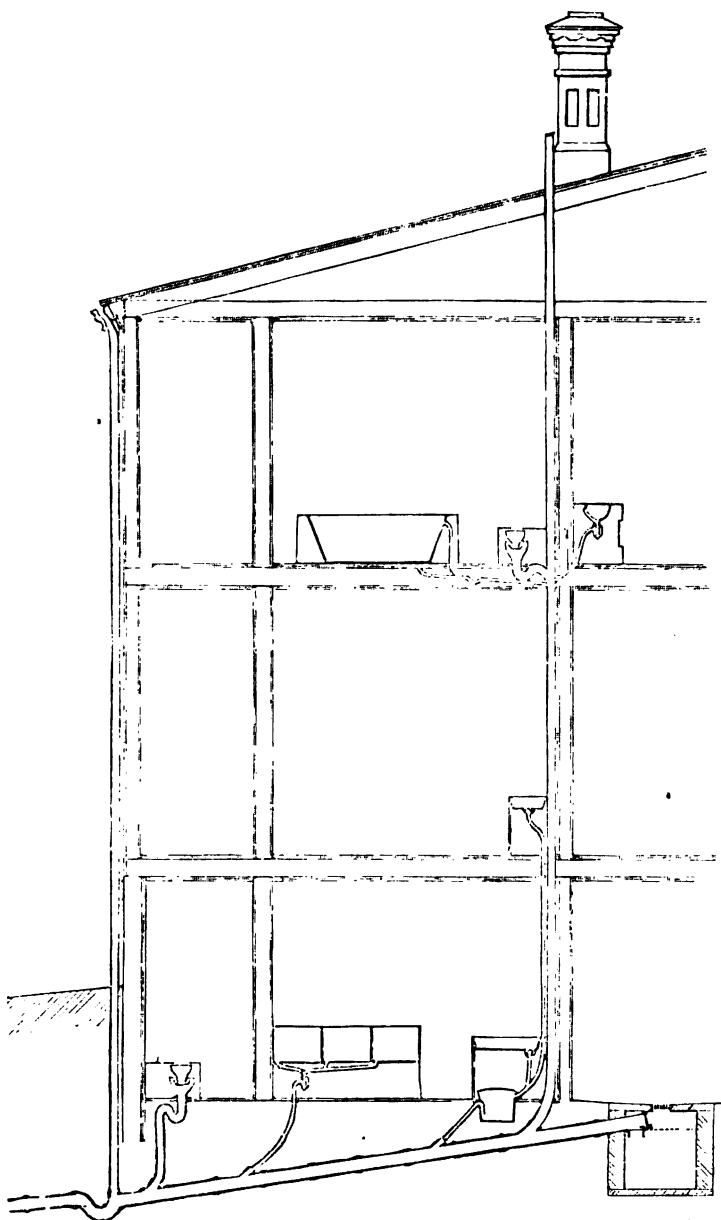
Fourth.—The top of the main should invariably be open.

Fifth.—Continue a ventilator from just below each small trap placed under water-closets, sinks, set-bowls, &c., and terminate it in the main above all other connections.

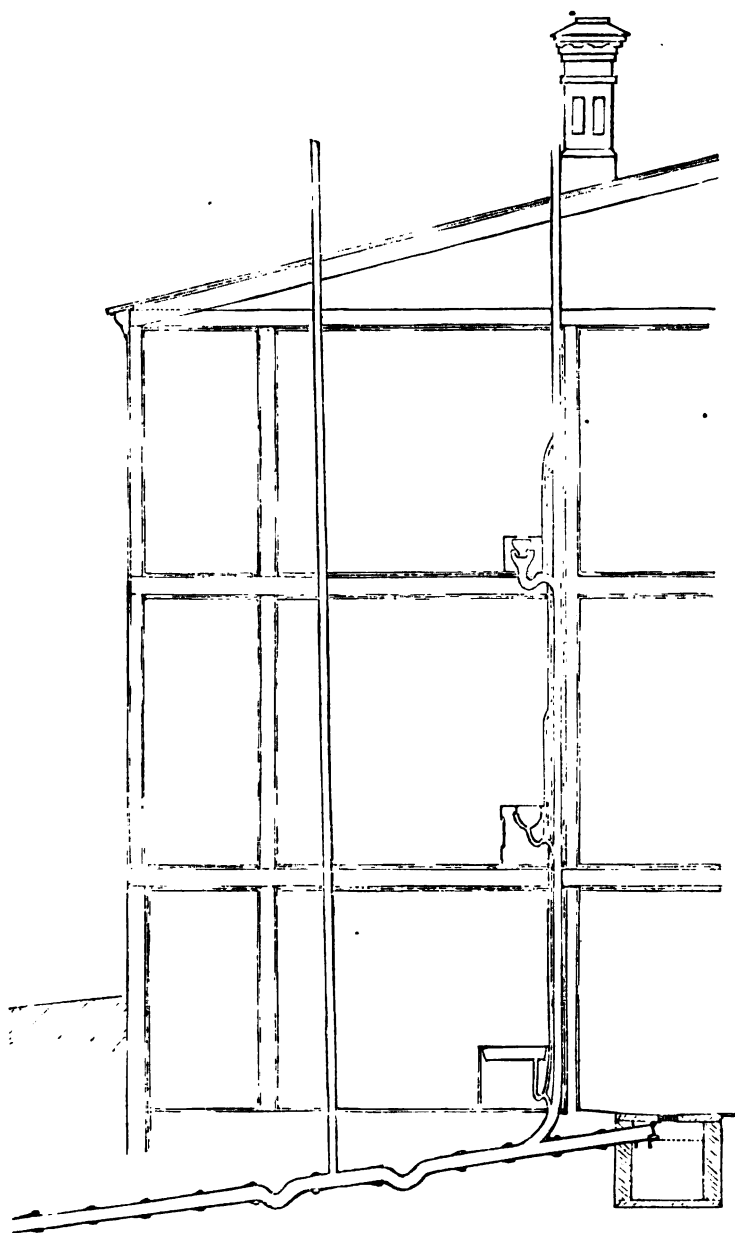
It may be said that to follow this advice involves great expense. It is not so. Even if it did, it would have nothing to do with its importance.

If it can be argued that the suggestions made will not insure perfect protection, it must at the same time be admitted that the present mode is imperfect and that the mode advised is an improvement. It is an important matter, and should sanitarians devise a more perfect mode than that now required by law and urge the Board of Aldermen to enforce its adoption, they would accomplish results the good of which would not only be immediate but would continue to exist and prove a boon to future generations. It is high time that the public and their representatives in legislative bodies were made to understand the importance and necessity of cleanliness, especially in populous places.

I gratefully acknowledge the courtesy of S. M. Gray, City Engineer, and O. F. Clapp, Assistant City Engineer, in cheerfully furnishing valuable information concerning the sewers of this city.



House Drainage and Ventilation of Drains, as required by
City Ordinance, Providence, R. I. See page 291.



House Drainage and Ventilation of Drains, as recommended in the paper "Disposition of Excretæ," &c. See page 293.

COLOR-BLINDNESS,

BY

WM. SHAW BOWEN, M. D.,

OF PROVIDENCE, R. I.,

COLOR-BLINDNESS.

The attention of the public has of late been directed to the subject of color-blindness, and to a large portion of the community it comes with the freshness of novelty.

That a certain proportion of individuals are deficient in the power of recognizing and discriminating certain of the primary hues of nature has been known for some years by a limited number of the educated, but it may be said that the infirmity has attracted but little thought outside the ranks of science.

It is the purpose of the writer to very briefly refer to the subject and to point out its practical bearing, without going beyond the citation of previously published opinions. It was in the beginning of this century that Dr. Young, in England, propounded the theory of light being confined to three primary colors determined by the special sense we call sight. These colors are red, green and violet, and by their combinations, in different proportions, the various colors in infinite variety are produced. Primary colors are determined by comparison of the equation of color by those with normal eyes, and those who are color-blind. "Equations of color-blindness are differentiated by the absence of one or more elements of color, the relationship of which to known colors can be determined." Color-blindness may therefore be determined as an insensibility to the colors red, green and violet, or an imperfect perception of one or all of them. The more common form in the human race is blindness for red. The red usually appears dark and is taken for green, and violet takes the place of pink. Brown, purple or orange are observed imperfectly or with the utmost difficulty. Blue and yellow are the easiest of recognition, the latter being always recognizable. Next in frequency is green-blindness, which may be connected with red-blindness, and drab is the color confounded with it. According to Wilson, common color-confusions are red with green, brown with green, and blue with green. Dr. Wilson,

of Edinboro, originated the term color-blindness. At this Dalton, an English chemist, published an account of the condition of his own eyes in 1798, he being unable to distinguish pink from blue. The older writers have called the condition Daltonism in consequence. Occasionally a case has been reported of a person who has no sense of color whatever, the eye being otherwise healthy. To such a person objects appear like those in a photograph, light and shade only. The perception of colors is naturally regulated by the quality of light, artificial light often-times throwing out red and green undetermined by natural light. Color-blindness is frequently hereditary and seems to be favored by consanguinity. It is usually congenital except when acquired through disease of the optic nerve or retina, and remains through life. A case cited by an English writer seems to afford an exception of acquirement. Without any disease of the eye or known injury, "a locomotive engineer, after an accident caused by his non-recognition of the danger signal red, confessed that his color-power, previously perfect, had gradually disappeared, and that being sensible of the loss he had determined to give up his situation prior to the occurrence of the accident." The man had been previously examined for color-blindness and found qualified for service in his position. The eye was in a healthy condition.

In certain hysterical affections color-blindness has been observed, it is then only temporary in duration. When congenital, it is usually unknown to the subject unless especially looked for. The proportion varies according to nationality and climate. According to the latest investigations, the percentage among males is from three to five per cent, and among females a little less than one per cent. It is more common in the uneducated classes, and this fact shows the necessity for carefully testing the eyes of all occupying positions in which use of the eyes in distinguishing colors accurately is indispensable. The detection is ordinarily easy if a few simple precautions are followed. A person when asked to name colors of any shade will do so if he has a knowledge of their correct names, but it is not infrequent that in congenital cases a knowledge of the names is absent. Such a person often distinguishes by the difference of shades, that is, difference in quantity of white light reflected. It may be seen, therefore, that the defect escapes detection unless many different colors are used in the test, Others often use the names of colors freely but do so not conveying the same meaning, and inevitable confusion results from an examination. Various physiologists and specialists on the eye have

studied the subject closely and have published the result of their researches with methods for ascertaining the presence of the defect. The spectroscope, colored letters and papers, silks, in fact, a great variety or ways, all more or less defective when brought into practical use.

The most approved method is that of Prof. Holmgren, of the University of Upsala, Sweden. He first used skeins of colored Berlin worsted. A variety of shades of the same color, not less than five of each, are placed on a table, and the person whose color-sense is to be tested is requested to select and place together all shades of the same color, beginning with those of red. If there is inability to determine accurately it will at once be apparent. The examination is ordinarily conducted with rapidity, a few minutes only being required. Dr. Jeffries has been one of the most indefatigable investigators in this country and he has carefully tested many thousand eyes in reference to the perception of colors. Through his efforts the subject has become one of interest to railway and steamboat managers, and the eyes of school children, in many of the large cities have been tested. Dr. Jeffries has popularized, as it were, the abnormality and has shown conclusively its dangers.

In every day life the evils are confined to the personal annoyance of the individual in whom the defect exists. In the incurable cases the occupation must be of such a nature as to preclude the necessity of discriminating shades of color. Many who are color-blind, however, by the careful observation of the effects of light, as previously mentioned, are enabled to handle worsteds and even apply and blend pigments, but this is done somewhat at random and certain effects are impossible of attainment.

A gentleman recently informed the writer that he is obliged to inquire which is the green light of the horse-car that passes his home. Amusing stories have been chronicled concerning the color-blind, and one of Dalton, who was one of the original investigators of the condition, may not be amiss. After he had published an account of his own condition he attracted general attention and was presented at Court. In the *Scientific London*, 1874, is described his presentation and the difficulties he raised over the customary Court costume then essential. "Firstly, he was a Quaker, and would not wear a sword, which is an indispensable appendage of ordinary court-dress. Secondly, the robe of a doctor of civil laws was known to be objectionable on account of its color,—scarlet,—one forbidden to Quakers. Luck-

ily it was recollected that Dalton was afflicted with the peculiar color-blindness that bears his name, and that, as the cherries and leaves of a cherry tree were to him of the same color, the scarlet gown would present to him no extraordinary appearance. So perfect, indeed, was the color-blindness, that this most modest and simple of men, after having received the doctor's gown at Oxford, actually wore it for several days in happy unconsciousness of the effect he produced upon the street."

Dr. Jeffries quotes a case as follows, it is that of a gentleman who says: "As far as I can tell, the following expresses my experience as to colors: Yellow is the brightest color; blue, nearly as bright. These two are the only ones I see distinctly in the rainbow. Red I can distinguish when bright; but delicate shades I confound with stone-color or gray. Green I have no distinct conception of. According to its different shades, it appears black, brown, red, yellow, blue and gray. I cannot distinguish, at any distance, the ripe cherries on a tree, or strawberries, from their leaves. I have no conception of what is meant by complementary colors, or of the agreement of different colors when blended together; as, for instance, what kind of a carpet accords with red curtains in a room. With regard to my want of perception of green, it appears to me that the blue and yellow rays neutralize each other, and, when in equal proportions, constitute what is really no color, varying all the way from a light drab to a dingy black. When the blue rays predominate, it appears a blue drab; and, when the yellow rays are in excess, it appears a yellow drab. When the blue and yellow are properly blended, a lady's dress of green silk appears to me very similar, and no more glaring than a drab silk. The dry dirt of the street I could equally suppose to be green. I also confound red and brown, frequently. I could not distinguish between treacle and blood spilt in a road by day light."

A boy fifteen years of age was brought to me by his parents, who were in a state of apprehension as to the future of his eye-sight. He would pick green berries with the ripe, and green fruit, as well. His father, ascribing it to carelessness, solely, punished the boy frequently, but, of course, without avail. The explanation was soon given that he was color-blind for certain hues. In the case of railway employés and all those who are called upon to so accurately determine colors as to jeopardize human life in event of failure to be exact, the question becomes one of vital importance, and the condition is no longer one to be considered as affecting the individual alone. The importance of

adopting strict precautions has long been recognized by foreign governments. On the continent of Europe, nearly all the different powers provide laws regulating the inspection and registration of all connected with railroads, who are by any possible chance called upon to recognize signals, and unless the required examination is satisfactorily passed, the person is considered ineligible. The reports published of this work are exceedingly interesting. "The last report of Dr. Favre, of the Lyons Mediterranean Railroad, (France,) gives the results of examinations of railroad employés since 1855. It shows also how more careful tests discover a greater proportion of color-blind persons. Dr. Favre, up to 1855, had examined about 5,000 candidates for railroad work, and rejected more than fifty for being *red-blind*. He had not, unfortunately, kept accurate records, for from 1855 to 1864, he noted eight color-blind only, which number does not correspond with the number of men examined. From 1862 to 1872, among 1,196 persons examined, he refused certificates to fourteen color-blind, who could not tell red. From May, 1873 to July, 1875, his examinations were more exact; and he found, among 1,050 persons seeking railroad employment, ninety-eight made decided blunders, or hesitated; and ten were rejected for being *red-blind*."

"Dr. Lederer found sixty-three color-blind persons among 1,312 men of the Austrian navy, or 4.8 per cent. Dr. Fontenoy found thirty-one color blind, out of 1,084 railroad employés of Denmark.

Prof. Donders, of Utrecht, Holland, found, among 2,300 railroad employés, 152 color-blind. Dr. Krohn, in Finland, found among 1,200 railroad people, sixty, or five per cent., color-blind." Examples may thus be given, *ad finitum*, of the occurrence of color-blindness among those employed in public service. The researches among children at school are equally fruitful in results. "Dr. Daae, of Kragerö, Norway, found amongst 205 school-boys, 4.88 per cent., color-blind. Dr. Cohn detected ninety-five among 2,429 school-boys of Breslau, or four per cent.; Dr. Magnus found among 3,273 school-boys, 3.5 per cent., color-blind." And Professor Holmgren, in the course of his very extensive investigations in Sweden, found, "among 32,165 males, 1,019, or 3.17 per cent., color-blind." In this country investigators have gone over the ground in many of the large cities, with painstaking zeal, and have published the results. The labors of Dr. Jeffries have been the most fruitful in demonstrating the extent of the peculiar optical condition. He examined 10,387, and found 431 color-blind—a high percentage, indeed, somewhat beyond the average.

It may be said, however, that the great skill and knowledge displayed by this eminent scientist, doubtless discovered certain obscure cases that ordinarily would escape detection. Dr. Jeffries considers the percentage is higher among American-born children, and that his observation does not bear out the statements of foreign statisticians that the more ignorant and degraded classes are more prone to color-blindness. The infrequency of the infirmity among females is a well known fact, and the subject is now undergoing investigation, without, however, any satisfactory explanatory results. Dr. Cohn "found among 1,061 Breslau school-girls, *none* color-blind." Dr. Magnus found in the same city "but one color-blind girl, among 2,216." Prof. Holmgren "reports from Sweden, having found, among 7,119 females of all ages, nineteen," or 0.26 per cent., color-blind. Dr. Jeffries inspected 7,942 females, and found four only, lacking in color perception. The writer has examined 842 male eyes in reference to the color sense, and, although the number is too limited to give valuable results, the percentage proved somewhat less than Dr. Jeffries examinations indicated.

Of the 842, nearly two-thirds were adults, and the eyes were, in a few cases, in an abnormal condition, aside from the color defect. One hundred and nine men were near-sighted, and eighty-two were hypermetropic, or over-sighted. Sixty-seven men were wearing spectacles for old sight; twenty-seven were color-blind out of the total of 842 examined; the percentage thus being less than four per cent. The red-blind numbered fifteen; the green-blind, eight. The Holmgren method, with colored worsteds, was employed. By request of the efficient superintendent of the New York, Providence and Boston railroad, J. B. Gardiner, Esq., an examination by the writer, of the knowledge of colors by those of the employes called on to recognize signals, either by night or day, is being made, and is at present uncompleted. In Massachusetts the examination has been very thorough, and the eyes of all train and switch men tested. The actual changes taking place in the eye that are recognized as the cause of color-blindness, are usually such as are only observed by aid of the microscope and possess little interest to the general reader. As previously mentioned, in a large majority of cases, the condition is incurable, although something is to be done in the way of educating the persons afflicted to discriminate by attending to light and shade. When all connected with railways and steamboats are known to be free from the defect, a well proved source of danger to life and limb will be averted.

A P P E N D I X .

THE REGISTRATION LAW OF RHODE ISLAND.

GENERAL STATUTES, CHAPTER 77.

OF THE REGISTRATION OF BIRTHS, DEATHS AND MARRIAGES.

(As amended June, 1875; April, 1878, and March, 1879.)

SECTION 1. The town clerks of the several towns, or in lieu thereof, any person whom the board of aldermen of any city, or the town council of any town, may appoint for that purpose, are hereby authorized and required to obtain, chronologically record and index, as required by the forms prescribed by the third section of this chapter, all information concerning births, marriages and deaths, occurring among the inhabitants of their respective towns; and on or before the first Monday of March, annually, to make duly certified returns thereof to the Secretary of the State Board of Health, for each year, ending on the thirty-first day of December, accompanying the same with a list of those individuals, required by law to make returns to him, who have neglected the same, and with such remarks relating to the object of the law, as they may deem important to communicate.

SEC. 2. The Secretary of the State Board of Health shall receive the returns made in pursuance of the preceding section, and annually make and publish, not exceeding one thousand copies, a general abstract and report thereof, in form as prescribed by section third of this chapter. The Secretary of State shall then cause said returns to be arranged, full alphabetical indices of all the names to be made, the whole to be bound in convenient sized volumes, and carefully preserved in his office, for which he shall receive the sum of fifty dollars.

SEC. 3. The blank forms required to carry out the provisions of this chapter shall, on application, be furnished by the Secretary of the State Board of Health, to clergymen, physicians, undertakers, town clerks, clerks of the Society of Friends, and other persons requiring them, substantially after the following forms, viz: The record of a birth shall state the date and place of birth, name

and sex of the child, whether living or still-born, the name and surname, color, occupation, residence and birth-place of the parents, and the time of recording, so far as the same can be ascertained. The record of a marriage shall state the date of the marriage, place, name, residence, and official station of the person by whom married, names and surnames of the parties, age, color, occupation, and residence of each, condition (whether single or widowed), what marriage, if second, third, or other marriage, the occupation, birth-place, and name of their parents, and the time of recording, so far as the same can be ascertained. The record of deaths shall state the date of death, name and surname of deceased, the sex, color, and condition (single or married), age, occupation, place of death, place of birth, names and birth-place of parents, disease or cause of death, and the time of recording, so far as can be ascertained.

OF MARRIAGES.

SEC. 4. Every Society of Friends, clergymen and all others, authorized to join persons in marriage, shall make a faithful record of every such rite performed by them, in manner and form aforesaid, and return the same on or before the second Monday of every month, for the last preceding month, to the clerk of the town in which such rite shall have been performed; and no marriage shall be solemnized until the parties shall have signed and delivered to the authority about to solemnize it, or to the clerk of a Society of Friends, a certificate containing the information required for the record of a marriage, as prescribed in the third section of this chapter.

OF BIRTHS.

SEC. 5 The clerk of every town, or in lieu thereof, some person or persons whom the town council of any town, or the board of aldermen of any city, shall appoint for the purpose, shall, annually, in the month of January, collect the facts required by section third of this chapter, in relation to all children born in the town during the year ending the thirty-first day of December next preceding, and for each full report of a birth so obtained, shall receive therefor such compensation as the town council or the board of aldermen of their respective towns or cities shall determine, in lieu of such compensation as may now be fixed by law. (By Chapter 782 of the Public Laws, the cities of Providence and Newport are exempt from the provisions of the preceding section, in relation to time of collection and compensation.)

OF DEATHS.

SEC. 6. "Whenever any person shall die or any still-born child shall be brought forth in this State, it shall be the duty of the physician attending at such bringing forth or last sickness, if any physician so attended, within forty-eight hours after such death or bringing forth, to leave with the family, if any, or person having the care of the deceased or the person bringing forth such still-born child, or to give to the undertaker or person who conducts the funeral, a certificate stating, in case of a death, the name of the deceased, the date of the death and the disease or cause of the death, and in case of the bringing forth of a still-born child, the date and the cause of such child being brought forth still-born."

OF UNDERTAKERS.

SEC. 7. There may be appointed by the town authorities of every town, a sufficient number of persons to act as undertakers, removable at the pleasure of the authorities.

SEC. 8. The undertaker, or the person who shall conduct a funeral, or who shall bury or deposit in a tomb, or who shall remove from this State or otherwise dispose of the remains of any deceased person or still-born child, shall first obtain the physician's certificate required by Section 6 of this chapter, if a physician was in attendance upon such person who has deceased, or the person bringing forth such still-born child, and shall return the same, together with his own certificate of the facts required by Section 3, as hereby amended, on or before the second Monday of the next succeeding month to the clerk of the town where such death or bringing forth took place.

SEC. 9. Any town may enact municipal laws, more effectually to attain the objects herein contemplated: *Provided*, they do not conflict with the main and specific object of this act, viz: to procure the most perfect registration.

OF FEES.

SEC. 10. The town clerks, or persons recommended and appointed as aforesaid, shall receive for each record of a death made and returned as required by law, and for each record of a marriage made and returned as required by law, twenty cents, to be paid to them out of their respective town treasuries; *Provided*, that the yearly compensation to be paid out of the town treasury as aforesaid, to any one town clerk or person appointed as aforesaid, who shall faithfully perform the duties prescribed by this chapter, shall not be less than five dollars. Undertakers and others making returns of deaths as required in Section 8 of this chapter shall receive for each full report of a death made to the town clerk, five cents in the cities of Providence and Newport, and ten cents in the other towns of the State.

SEC. 11. If any clergyman, physician, undertaker, town clerk, clerk of any meeting of the Society of Friends, or other persons, shall willfully neglect or refuse to perform any of the duties imposed on, or required of him, by this chapter, he shall, at the discretion of the court trying the case, be fined not exceeding twenty dollars for each offence, one-half thereof to the use of the town in which the offence shall occur, the other half to the use of the person who shall complain of the same.

SEC. 12. In order that it may be more surely ascertained that no clergyman, physician, coroner, undertaker, or clerk of the Society of Friends, neglects to make the returns specified in this chapter, each of the said parties shall cause his name and residence to be recorded in the clerk's office of the town where he resides.

SEC. 13. No letters of administration, or letters testamentary, shall be granted by any court of probate, upon the effects or estate of any person, until the death of such person, or the facts from which the same is presumed, shall be duly certified, as near as may be, to the town clerk, in order that the same may be duly registered according to the provisions of this chapter.

SEC. 14. The person appointed as provided in Section 1 of this chapter, shall be entitled to have the custody of all records of births, deaths or marriages of the town or city for which he is appointed, whether made under the statute now in force or any former statute, and a certificate signed by him as town or city registrar certifying that any written or printed statement of any marriage, birth or death is a true copy of the record in his custody, shall be admitted as *prima facie* proof of such marriage, birth or death.

SEC. 15. Births, marriages and deaths, of non-residents, shall be distinguished from those of residents, in the returns by being arranged separately.

SEC. 16. The Secretary of the State Board of Health may, from time to time, vary the forms of returns, and require such additional information as he may consider necessary, to effect the object of this chapter.

SEC. 17. *Repealed January Session, 1878.*

SEC. 18. The town clerks or other officers appointed under this chapter, to collect, record and return the births in the several towns, shall receive fees therefor as follows: For collecting the facts required in relation to births, fifteen cents each; for making record and return of these facts as required by law, twenty cents each for the first fifty entries in each calendar year, and ten cents each for each subsequent entry and return.

SEC. 19. The returns required to be made by clerks of the supreme court, in relation to divorces, to the Secretary of the State Board of Health, or a prepared abstract thereof, shall be published in the annual report upon the births, marriages and deaths in the State.

PUBLIC LAWS, CHAPTER 680.

AN ACT TO ESTABLISH A STATE BOARD OF HEALTH.

(As passed April 12, 1878, and amended March, 1880.)

It is enacted by the General Assembly as follows:

SECTION 1. The Governor, with the advice and consent of the Senate, shall appoint six persons, two from the county of Providence, and one from each of the other counties, who shall constitute the State Board of Health. Of the persons so appointed, at least three shall be well educated physicians and members of some medical society incorporated by this State. The Governor may remove any member for cause, at any time, upon the written request of two-thirds of the board.

SEC. 2. The six persons first appointed shall be appointed for one, two, three, four, five and six years, respectively, and hereafter, the Governor, with the advice and consent of the Senate, shall appoint one member of the board annually, for the term of six years from the first day of July. Any appointment to fill a vacancy shall be for the remainder of the term.

SEC. 3. The board shall take cognizance of the interests of life and health among the citizens of the State; they shall make investigations into the causes of

disease, and especially of epidemics and endemics among the people, the sources of mortality, and the effects of localities, employments, conditions and circumstances on the public health, and shall faithfully do all in their power to ascertain the causes and the best means for the prevention of diseases of every kind in the State. They shall publish and circulate, from time to time, such information as they may deem to be important and useful for diffusion among the people of the State, and shall investigate and give advice in relation to such subjects relating to the public health, as may be referred to them by the General Assembly, or by the Governor when the General Assembly is not in session.

SEC. 4. The State Board of Health shall also investigate the subject of diseases among cattle or other animals, and perform all the duties which have been delegated to the Board of Cattle Commissioners, in chapter 76, of the General Statutes of the State.

SEC. 5. Section 3, of chapter 76, of the General Statutes, is hereby repealed, and the Board of Cattle Commissioners, heretofore constituted under authority of said section, is hereby abolished.

SEC. 6. In every section of chapter 76, of the General Statutes, where the word "commissioners" occurs, it shall be construed to mean State Board of Health.

SEC. 7. The State Board of Health shall receive the returns of births, marriages, deaths and divorces, and shall prepare the annual report upon the registration of the same as now required by law; but after the report is prepared, the returns shall be deposited in the office of the Secretary of State, to be bound and indexed by him as heretofore.

SEC. 8. Wherever the words "Secretary of State" occur in sections 1, 2, 3, 16 and 19, of chapter 77, of the General Statutes, they shall be construed to mean Secretary of the State Board of Health, and in the sixth line of section 2, of said chapter, the word "he" shall be construed to mean Secretary of State. Section 17, of chapter 77, of the General Statutes, is hereby repealed.

SEC. 9. The board shall meet in the city of Providence once in three months, and as much oftener as they may deem necessary. No member of the board, except the secretary, shall receive any compensation for his services; but the actual personal expenses of any member, while engaged in the duties of the board, shall be paid by the State.

SEC. 10. The board shall elect a well qualified physician as their secretary, who shall be *ex-officio* a member of the Board, the Commissioner of Public Health, and State Registrar of Vital Statistics; but shall not thereby vote on any question upon which he is personally interested, or be entitled to any additional compensation for mileage or expenses.

SEC. 11. The secretary shall perform and superintend the work prescribed in this law, and such other duties as the board may require, and he shall receive such salary, not in excess of twelve hundred dollars per annum, as the board may determine. He shall hold his office at the pleasure of the board, but may be removed at any regular meeting by a majority vote of the members thereof.

SEC. 12. The Governor shall provide a suitable office for the board in the city of Providence, and the actual expenses of the board and of the members thereof, when certified by the chairman and approved by the Governor, shall be paid from the treasury of the State.

SEC. 13. The board shall make a report in print to the General Assembly, annually, of its proceedings during the year ending on the thirty-first day of December next preceding, with such suggestions in relation to the sanitary laws and interests of the State as they shall deem important.

SEC. 14. All acts and parts of acts inconsistent herewith are hereby repealed.

SEC. 15. The several town councils and boards of aldermen shall still be *ex-officio* Boards of Health in their respective towns, as is now by law provided. *Provided, however,* that the city council of any city may appoint a Board of Health for such city, which shall have all the powers and duties now conferred by law upon the board of aldermen as a Board of Health.

PUBLIC LAWS, CHAPTER 794.

SECTION 3. The secretary of the said board shall make inquiry from time to time, of the clerks of town and local boards of health, in relation to the prevalence of any disease, or knowledge of any known or generally believed source of disease, or causes of general ill-health, and also in relation to the proceedings of the said boards of health, in respect to acts for the promotion and protection of the public health, and also in relation to diseases among domestic animals, in their several towns and localities respectively; and the said clerks of town and local boards of health shall give such information, in reply to said inquiries, of such facts and circumstances as have come to their knowledge.

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